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ELEMENTS

OF

MEDICAL

JURISPRUDENCE.

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JURISPRUDENCE.

By THEODRIC ROMEYN BECK, M.D.

PROFESSOR OF THE INSTITUTES OF MEDICINE, AND LECTURER ON MEDICAL
JURISPRUDENCE IN THE COLLEGE OF THE WESTERN DISTRICT OF
THE STATE OF NEW YORK, &c. &c.

SECOND EDITION,
WITH NOTES, AND AN APPENDIX
OF
ORIGINAL CASES AND THE LATEST DISCOVERIES.

By WILLIAM DUNLOP,

MEMBER OF THE ROYAL COLLEGE OF SURGEONS, LONDON; OF THE MEDICO-
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EDITOR'S PREFACE.

The reproach of deficiency in the science of Medical evidence, which has so long been attached to English literature, has at last been removed, and we can now claim respectability, if not superiority, for our works on Medical Jurisprudence, and challenge a comparison with the best of those of the Continent. Dr. Male has the honour of having given the first impulse to the subject, by his small but excellent work, and the science in a few years has, like the mustard-seed in the Scripture parable, increased into a branching tree of great amplitude.

The work of Dr. Gordon Smith is original in its arrangement, and so far as it goes is distinguished, as Dr. Beck remarks, for the good sense of the author; but, without derogating from the merit of Dr. Smith, we may justly say that it is extremely deficient as a book of reference, and could not indeed have well been made so without being greatly enlarged beyond its present size. Dr. Smith, indeed, has evidently intended to make it an elementary treatise, rather than a work for practical consultation, as may be inferred both from the size and style of the work, and from the paucity of his references to original documents.—The large work on Medical Jurisprudence by Dr. Paris and Mr. Fonblanque is the next in order of time, and is much more copious in cases and illustrations than any previous English work on the science. The style is very laboured, though the labour we conceive would have been much better bestowed on the logical arrangement and sequence of the facts. A reference to the section on Rape will explain our meaning, in which the text consists chiefly of law-cases and discussions, while many of the medical parts of the subject, which undoubtedly ought to have occupied the most prominent place, are transferred in a very illogical manner to the notes,—for want of leisure, it might be, to dispose of them in their proper places in the text. Besides this defect in the work of Paris and Fonblanque, there are a great many useless and irrelevant details, which add to the bulk and price of the book, while they certainly detract from its merits.

We do not claim for the present work the meed of a faultless performance; but we fear not to challenge a comparison of it with any of the English works in scientific accuracy, philosophical plainness and precision of style, extent of research, genuine scholarship and erudition, pointedness of illustration, and copiousness of detail and reference to original documents. We may say, with Dr. Andrew Duncan, jun. in his excellent review of the first edition, that "under the unassuming title of Medical Jurisprudence, Dr. Beck has presented us with a comprehensive system, which embraces almost every valuable fact or doctrine relating to it. Each of its diversified departments has been investigated so minutely, that few cases can occur in practice on which it will be necessary to seek elsewhere for farther information." * Dr. Male also, the father of English Medical Jurisprudence, has the highest opinion of the book, and says, " Dr. Beck has recently published one of the best works on Juridical Medicine which has been compiled either in this or any other country." Supported by such unqualified opinions of its excellence, from two of the best judges of the subject in the empire, Dr. Duncan and Dr. Male, we submit it, with confident hopes of its success, to the practitioners and students of medicine and law.

Of the additional notes it does not become us to say much; indeed, Dr. Beck has left almost nothing for an Editor to add, and the reader must not, therefore, expect a voluminous commentary. The new cases, however, it may be stated, are chiefly original, and many of them fell under the Editor's immediate observation. Several of the Scots cases were taken by

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* Review of Beck in the Edin. Med. and Surg. Journ. July 1824.

permission from the notes of the present Head of the Justiciary Court of Scotland. The most copious notes have been given where Dr. Beck, from a desire to condense, has been more brief than usual; more particularly in that part of the work which relates to external injuries.

A letter has just been received from Dr. Beck, referring to a few recent cases which he is desirous of having inserted in this Edition; but, as the last sheets were in the press, this could not be done in the body of the work, and they have, therefore, been added in an Appendix, in accordance with his wish.

PREFACE.

After several years of diligent investigation, I venture to offer the following work to the notice of the public. Whether its execution is adequate to the importance of its subject, must be decided by a candid and enlightened community.

At an early period of my medical life, I became impressed with the necessity of greater attention to the science of Medical Jurisprudence than is usually devoted to it by physicians. The writings in the English language, on the subject, were at that time confined to a small duodecimo volume, together with some detached essays on particular points; and I soon ascertained that, in order to learn what had been accomplished in this branch of learning, I must resort to the study of continental authors. But my inland situation, and the embarrassed state of the commerce of the country, seemed to present obstacles almost insurmountable to the acquisition of the systematic writers in question.

During the late war, however, a respected relative, (the REV. DR. ROMEYN, of New-York,) while abroad, procured, from different quarters, the principal French authors on Medical Jurisprudence, and, on his return, I had the pleasure of commencing its study with suitable materials.

Some years thereafter, my friend, Dr. John W. Francis, also visited Great Britain and France, and kindly undertook to procure for me whatever might come within his observation on the science.

My appointment in the WESTERN MEDICAL COLLEGE rendered what had previously been a private study, a public duty; and I began to flatter myself that a publication on the subject might be found useful. The increasing attention to the science in Great Britain and this country, with the great facilities that of late years have offered themselves for obtaining scientific works from abroad, has encouraged me to prosecute my undertaking to its present termination.*

This brief sketch of the origin and progress of the present work will not, I hope, be deemed impertinent. At all events, I feel a pleasure in thus publicly acknowledging the aid I have received.

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* I am under peculiar obligations to Mr. James Eastburn, of New-York, for his attention in obtaining, from time to time, comparatively rare works from Germany and France.

I might add to the names already mentioned, a number of others, particularly in this city, that have allowed me free access to their libraries, or directed my researches to points with which I was least familiar. Were I to enumerate all of these, it might savour of ostentation, and I will content myself with returning them my sincere thanks for their liberality, and the kind encouragement with which they have frequently cheered me.

My medical friends in this city and in New-York no less deserve my grateful acknowledgments; and I must not omit noticing the advantages derived from consulting many valuable works in the State Library, and the Libraries of the Society for the promotion of Useful Arts, and of the Western Medical College.

In concluding these prefatory remarks, I may be permitted to add, that although this work is designed primarily for the benefit of physicians, yet I trust it may occasionally be found useful to the gentlemen of the bar. It need hardly be suggested, that, in many instances, a legal decision depends on the testimony of medical witnesses; and it may not only prove a matter of satisfaction, but even a solid gain to the cause of justice, to be enabled to compare oral opinions with the prevailing doctrines of the profession. Of such importance is the subject of Medical Jurisprudence at present considered, that in the latest work that has been published in England on it, an eminent barrister has been associated with a no less eminent practitioner.*

Should the present treatise be so fortunate as to meet with the approbation of the public, I design, at no very distant period, to offer another on MEDICAL POLICE. The materials for both have been in some degree simultaneously collected.

Albany, August 30, 1823.

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* "MEDICAL JURISPRUDENCE, by J. A. PARIS, M. D. F. R. S. and J. S. M. FONBLANQUE, Esq. Barrister-at-Law. London, 1823." I received a copy of this work in the month of July, after about half of my own was printed, and all, except a few pages, was written. Having consulted the same authorities, it was to be expected that the leading outlines of the science would be similarly treated; and, on minor points, I am happy to find, that in several instances I have arrived at the same results with Dr. Paris. What may be deemed his strictly original enquiries had already appeared in the PHARMACOLOGIA, and to this I have given due credit.

CATALOGUE OF BOOKS REFERRED TO.

☞ *As many of the systematic works on Medical Jurisprudence, together with several periodical publications, are very frequently quoted in the ensuing pages, I conceived it would be preferable to give a catalogue of them in the commencement of the work. I shall thus be enabled to render the subsequent references more concise. The words in italics, at the commencement of every title, are used in the body of the work.*

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American Medical Recorder. Conducted by Drs. Eberle, Ducachet, &c. &c. (Commenced in 1818.) 5 vols. 8vo. Philadelphia. (1818 to 1823.)

American Philosophical Society, held at Philadelphia, Transactions of. 7 vols. 4to. Philadelphia. (1786 to 1818.)

Annals. Annals of Philosophy, or Magazine of Chemistry, Mineralogy, Mechanics, &c. By Thomas Thomson, M. D. F. R. S. &c. 16 vols. 8vo. London. (1813 to 1820.)

Annals, N. S. Annals of Philosophy, New Series. By Richard Phillips. 4 vols. 8vo. London. (1821, 1822.)

Baillie. The Morbid Anatomy of the Human Body. By Matthew Baillie, M. D. F. R. S.

Ballard. See Metzger.

Bartley. A Treatise on Forensic Medicine, or Medical Jurisprudence. By O. W. Bartley, M. D. Bristol. 1815. 12mo.

Barton's Medical Botany, or Vegetable Materia Medica of the United States, &c. By W. P. C. Barton, M. D. Surgeon in the U. S. Navy, and Professor of Botany in the University of Pennsylvania. 2 vols. 4to. Philadelphia. 1817 and 1818.

Barton's Medical and Physical Journal. The Philadelphia Medical and Physical Journal, collected by Benjamin S. Barton, M. D. Professor of Materia Medica in the University of Pennsylvania. 3 vols. 8vo. Philadelphia. 1805 to 1809.

Beckmann. A History of Inventions and Discoveries. By John Beckmann, Public Professor of Economy in the University of Gottingen. Translated from the German, by William Johnston. 4 vols. 8vo. London. 1797. 4th vol. 1814.

Belloc. Cours de Medicine Legale, theorique et pratique; ouvrage utile, non-seulement aux medecins et aux chirurgiens, mais encore aux juges et aux jurisconsultes. Par J. J. Belloc, Medecin Operant, Professeur particulier de Medicine et Chirurgie; Membre de la Societé d'Agriculture, Sciences et Arts, seante a Agen; Correspondant de la Societé de Medecine, et de celle de l'Ecole de Paris, &c. &c. Seconde edition, corrigée et augmentée. 8vo. Paris. 1811.

Bigelow's Medical Botany. American Medical Botany; being a collection of the native medicinal plants of the United States, &c. By Jacob Bigelow, M. D. Rumford Professor, and Lecturer on Materia Medica and Botany, in Harvard University. 2 vols. 8vo. Boston. 1817, 1819.

Blatchford's (Thomas W.) Inaugural Dissertation on Feigned Diseases. New-York. 1817.

Bohn, D. J. Bohnii Anat. et Chirurg. Prof. Pub. Lips. De Renunciatione Vulnerum, seu Vulnerum Lethalium Examen, &c. Editio altera. Amstelodami. 1732. 12mo.

Bostock. A Vindication of the Opinions delivered in evidence by the Medical Witnesses for the Crown, on a late trial at Lancaster, for Murder. 8vo. Liverpool. 1808.

Brande. A Manual of Chemistry, &c. By William T. Brande, S.R.S. F. R. S. E. &c. &c. with notes and emendations, by Wm. Jas. M'Neven, M.D. Professor of Chemistry, &c. New-York. 8vo. New-York. 1821.

Brande's Journal. A Journal of Science, Literature, and the Arts. Edited at the Royal Institution of Great Britain, (by William T. Brande, F. R. S. &c.) 8vo. 14 vols. I have used the American edition in my quotations from the first five volumes.

Brendelii, (John Gothofredi.) Archiatri Quondam Regii, et in Academia Georgia-Augusta Professoris Medicinæ Ordinarii Celeberrimi MEDICINA LEGALIS sive FORENSIS; ejusdemque Prælectiones Academicæ in Hermanni Fried. Teichmeyeri Institutiones Medicinæ Legalis, edi curavit, notis quibusdam, et indice locupletissimo auxit F. GOTTLEIB MEIERUS, M. D. &c. &c. 4to. Hannoveræ. 1789.

Burns. The Principles of Midwifery, including the Diseases of Women and Children. By John Burns, Lecturer on Midwifery, and Member of the Faculty of Physicians and Surgeons, Glasgow. 8vo. London. 1809.

Capuron. La Medecine Legale relative a l'Art des Accouchemens. Par J. CAPURON, Docteur en Medecine de la Faculté de Paris, Professeur d'Accouchemens, des Maladies des Femmes et des Enfans; Membre de plusieurs Societés nationales et etrangères. 8vo. Paris. 1821.

Causes Célèbres, par Mejan. Recueil des Causes Célèbres, et les arrêts qui les ont decidées; redigé par Maurice Mejan, Jurisconsulte, Membre de l'Atheneé de la Langue Française. 18 vols. 8vo. Paris. 1808 to 1813.

Chapman's Journal. The Philadelphia Journal of the Medical and Physical Sciences. Edited by Nathaniel Chapman, M.D. Professor of the Institutes and Practice of Physic, &c. University of Pennsylvania. Commenced in 1820. 5 vols. 8vo. Philadelphia. (1820 to 1823.)

Collinson on Lunacy. A Treatise on the Law of Idiots, Lunatics, and other persons *non compotes mentis*. By George Dale Collinson, A.M. of Lincoln's-Inn, Barrister-at-Law. 2 vols. 8vo. London. (1812.)

Conquest. Outlines of Midwifery, developing its principles and practice. By J. T. Conquest, M. D. F. L. S. &c. Second edit. 12mo. London. 1821.

Cooper. Tracts on Medical Jurisprudence; including FARR's Elements of Medical Jurisprudence, DEASE's Remarks on Medical Jurisprudence, MALE's Epitome of Juridical or Forensic Medicine, and HASLAM's Medical Jurisprudence, as it relates to Insanity; with a preface, notes, and a digest of the law relating to insanity and nuisance. By Thomas Cooper, Esq. M. D. Professor of Chemistry and Mineralogy in the University of Pennsylvania, &c. With an Appendix, &c. 8vo. Philadelphia. 1819. In quoting from this work, I have referred to each author, as I may have had occasion to notice him. Whenever any of the observations of Dr. Cooper are mentioned, I give him the proper credit.

Dease. Remarks on Medical Jurisprudence; intended for the general information of juries and young surgeons. By William Dease, Surgeon.

(Inscribed to Lord Clonmel, Chief-Justice of Ireland.) This is published in COOPER's Tracts, which see.

De Haen, (Antonii.) Consiliarii Aulici ac Medicinæ Practicæ in alma et antiquissima Universitate Vindobonensi, Professoris Primarii, RATIO MEDENDI in Nosocomio Practico Vindobonensi. 4 vols. 8vo. Leyden. 1761—1772.

Denman. An Introduction to the Practice of Midwifery. By Thomas Denman, M. D. &c. &c. With notes and emendations, by John W. Francis, M. D. Professor of Obstetrics, &c. &c. New-York. 8vo. 1821.

Dorsey. Elements of Surgery, &c. By John Syng Dorsey, M. D. Adjunct Professor of Surgery in the University of Pennsylvania, &c. 2 vols. 8vo. Philadelphia. 1813.

Ducachet's (Henry W.) Inaugural Dissertation on the action of Poisons. New-York. 1817.

East. A Treatise of the Pleas of the Crown. By Edward Hyde East, Esq. of the Inner Temple. 2 vols. 8vo.

Eclectic Repertory, and Analytical Review, Medical and Philosophical. Edited by a Society of Physicians. Philadelphia. 10 vols. 8vo. (1810 to 1820.)

Edinburgh Medical Essays and Observations. Published by a Society in Edinburgh. 5th edition. Edinburgh. 1771. 6 vols.

Edinburgh Medical and Surgical Journal. Exhibiting a concise view of the latest and most important discoveries in Medicine, Surgery, and Pharmacy. Edinburgh. 18 vols. 8vo. (1805 to 1823.)

Edinburgh Philosophical Journal. Exhibiting a view of the progress of discovery in Natural Philosophy, Chemistry, Natural History, Practical Mechanics, Geography, Statistics, and the Fine and Useful Arts. Conducted by Dr. Brewster and Professor Jameson. Edinburgh. 8 vols. 8vo. (1819 to 1823.)

Farr. Elements of Medical Jurisprudence; or a succinct and compendious description of such tokens in the human body, as are requisite to determine the judgment of a coroner, and courts of law, in cases of divorce, rape, murder, &c. To which are added, directions for preserving the public health. By Samuel Farr, M. D. 2d edit. London. 1814. 12mo.

Fearne. The Posthumous Works of Charles Fearne, Esq. Barrister at Law. Selected from the author's manuscripts, by Thomas M. Shadwell, of Gray's Inn, Esq. 8vo. London. 1797. (*See Presumption of Survivorship.*)

Foderè. Traité de Medecine Legale, et D'Hygiene Publique ou de Police de Santé, adapté aux Codes de L'Empire Francais, et aux Connaissances Actuelles, &c. Par. F. E. FODERE, Docteur en Medecine. 2d edition. 6 vols. 8vo. Paris. 1813.

Foderè. Traité du Delire. Traité du Delire appliqué a la Medecine, a la Morale, et a la Legislation. Par F. E. Foderè, Professeur de Medecine Legale et de Police Medicale, al a Faculté de Medecine de Strasbourg, &c. 2 vols. 8vo. Paris. 1817.

Francis' Denman. See *Denman.*

Godman. The Western Quarterly Reporter of Medical, Surgical, and Natural Science. Supported by Physicians and Naturalists of the Western Country. Edited by John D. Godman, M. D. &c. &c. &c. 5 Nos. Cincinnati, (Ohio.) 1822. *(This work contains some very valuable essays on Medical Jurisprudence, translated from the French.)*

Goodwyn. The Connection of Life with Respiration: or an experimental inquiry into the effects of submersion, strangulation, and several kinds of noxious airs, on living animals, &c. By Edmund Goodwyn, M. D. 8vo. London. 1788.

Gordon. Tentamen Inaugurale Medicum de Arsenico, quam annuente, &c. pro gradu Doctoris, &c. Jacobus A. Gordon, Chirurgus, &c. 8vo. Edinburgh. 1814.

Haller, *Elementa Physiologiæ* Corporis Humani. Auctore Alberto V. Haller, Preside Societ. Reg. Scient. Gotting. &c. &c. 8 vols. 4to. Lausanne and Berne. 1757—1766.

Harleian Miscellany, The. 8 vols, 4to. London. 1745.

Haslam's Medical Jurisprudence, as it relates to *Insanity*, according to the Law of England. By John Haslam, M. D. late of Pembroke Hall, Cambridge, &c. See *Cooper's Tracts*.

Haslam on Madness. Observations on Madness and Melancholy; including practical remarks on those diseases, together with cases, &c. By John Haslam, late of Pembroke Hall, Cambridge, &c. 2d edition, 8vo. London. 1809.

Hebenstreit, (D. Jno. Ern.) In Universitate Lipsiensi Therapiæ Prof. Pub. Facultatis Medicæ Decani Urbis Physici, ANTHROPOLOGIA FORENSIS sistens medici circa rempublicam, caussasque dicendas officium, &c. 12mo. Leipsic. 1751.

Hennen. Principles of Military Surgery; comprising observations on the arrangement, police, and practice of Hospitals, &c. By John Hennen, M. D. F. R. S. E. Deputy Inspector of Military Hospitals. 2d edition. 8vo. Edinburgh. 1820.

Henry. The Elements of Experimental Chemistry. By William Henry, M. D. F. R. S. &c. The third American, from the sixth English edition, with notes, by Professor Silliman, of Yale College. 2 vols. 8vo. Boston. 1814.

Highmore. A Treatise on the Law of Idiotcy and Lunacy. By A. Highmore, Author of the Law of Mortmain, &c. 8vo. Exeter, (New-Hampshire.) 1822.

Hill. An Essay on the Prevention and Cure of Insanity; with observations on the rules for the detection of pretenders to madness. By George Nesse Hill, Medical Surgeon, &c. 8vo. London. 1814.

Hosack. The American Medical and Philosophical Register. Conducted by Drs. Hosack and Francis. 4 vols. 8vo. New-York. (1811 to 1814.)

Hutchinson. A Dissertation on Infanticide, in its relations to Physiology and Jurisprudence. By William Hutchinson, M. D. F. L. S. 8vo. pp. 100. London. 1820.

Johnson. An Essay on the Signs of Murder in new-born Children. Translated from the French of Dr. P. A. O. Mahon, Professor of Forensic Medicine in the Medical School of Paris, by Christopher Johnson, Surgeon, Lancaster; with a preface and notes. 8vo. Lancaster. 1813.

Journal of Foreign Medical Science and Literature. (The) A continuation of the Eclectic Repertory. Conducted by Samuel Emlen, Jun. M. D. and William Price, M. D. 2 vols. 8vo. Philadelphia. (1821—1822.)

Larrey. Memoirs of Military Surgery, and Campaigns of the French Armies on the Rhine, in Corsica, Catalonia, Egypt, &c. &c. From the French of D. J. Larrey, M. D. First Surgeon of the Imperial Guard, &c. &c. By Richard Willmott Hall, M. D. Professor of Midwifery in the University of Maryland. 2 vols. 8vo. Baltimore. 1814.

Le Clerc. Essai medico-legal sur l'empoisonnement, et sur les moyens que l'on doit employer pour les constater. Par N. Le Clerc, Docteur en Medicine, ex Aide-Bibliothecaire de l'Ecole Speciale de Medicine de Strasbourg. 8vo. Paris. 1803.

London Medical and Physical Journal. Of this I have only been enabled to consult detached volumes—from vol. 1 to 16, and from vol. 21 to 31 inclusive.

London Medical Repository, Monthly Journal, and Review. Conducted at various times by Messrs. Burrows, Royston, and A. T. Thomson; and by Dr. Burrows and Mr. Thomson; and by Dr. Uwins, Mr. Palmer, and Mr. Gray. Commenced in 1814. 15 vols. 8vo. London. (1814 to 1822.)

Louis. Lettres sur la certitude des signes de la Mort; avec des observations et des experiences sur les Noyés. Par M. Louis, Conseiller, et Commissaire pour les extraits de l'Academie Royale de Chirurgie, &c. &c. Paris. 1752. 12mo.

Louis' Memoire. Recueil d'Observations d'Anatomie et de Chirurgie, pour servir de base à la theorie des lesions de la tête, par contre-coup. Nouvelle edition, ou l'on a joint le *Memoire* contre la Legitimité des Naissances pretendues tardives, avec le Supplement au dit Memoire. Par M. Louis. Paris. 1788. 12mo.

Löw, (Joh. Francisci,) &c. &c. Theatrum Medico-Juridicum; continens variasque easque maxime notabiles, tam ad tribunalia ecclesiastico-civilia, quam ad medicinam forensem, pertinentes materias, &c. 4to. Norimbergæ. 1725.

Ludwig, (D. C. Gottleib.) Ord. Med. in Acad. Lips. Decani, Institutiones Medicinæ Forensis Prælectionibus Academicis accommodatæ. 8vo. Leipsic. 1765.)

Mahon. Medecine Legale, et Police Medicale, de P. A. O. Mahon, Professeur de Medecine Legale et de l'Histoire de la Medecine à l'Ecole de Medecine de Paris; Medecin en Chef de l'Hospice des Venériens de Paris, &c. avec quelques notes de M. Fautrel, ancien Officier de Santé des Armées. 3 vols. 8vo. Paris. 1811.

Magendie. De l'Influence de l'Emetique sur L'Homme et sur les Animaux; Memoire lu à la premiere classe de l'Institut de France le 23 Août, 1813. Par M. Magendie, Docteur Medecin de la Faculté de Paris, Professeur, &c. 8vo. Paris. 1813. pp. 62.

Male. An Epitome of Juridical or Forensic Medicine, for the use of medical men, coroners, and barristers. By George Edward Male, M.D. one of the Physicians to the General Hospital in Birmingham. (First published in 1816.) This work is quoted according to its paging in COOPER's Tracts, which see.

Marc. Manuel D'Autopsie Cadaverique Medico-Legale, traduit de l'Allemand du Docteur ROSE, sur la derniere edition, augmenté de notes, et de deux memoires sur la docimasie pulmonaire, et sur les moyens de constater la mort par submersion. Par C. C. H. Marc, Docteur en Medecine. 8vo. Paris. 1808. *All the references to this work are designated by the name of the editor.*

Marshall. Remarks on Arsenic, considered as a poison and a medicine, &c. &c. By John Marshall, Member of the Royal College of Surgeons in London. 8vo. London. 1817.

Medical Commentaries. Edinburgh. 20 vols. 8vo. (Edited by Andrew Duncan, Sen. M. D.) My references to the 19th and 20th volumes, are from the American edition, as the English copy which I used only included the first eighteen volumes.

Medical Transactions. Published by the College of Physicians in London. 6 vols. 8vo. London. (1768 to 1820.)

Medico-Chirurgical Review, and Journal of Medical Science. Conducted by associated Physicians and Surgeons, and superintended by James Johnson, M. D. (Analytical Series.) 5 Nos. New-York. 1823.

Medico-Chirurgical Transactions. Published by the Medical and Chirurgical Society, London. 8vo. 11 vols. and vol. 12, part 1, (1809 to 1822.)

Memoirs of Literature. By Michael De La Roche. 8 vols. 8vo. 2d edit. London. 1722.

Memoirs of the Medical Society of London, instituted in the year 1773. 6 vols. 8vo. London. (1789 to 1805.)

Metzger. Principles de Medecine Legale ou Judiciare, traduits de l'Allemand du Docteur J. Dan. Metzger, et augmentés de notes par le Dr. J. J. Ballard, Medecin Ordinaire de la Grande Armée, &c. 8vo. Autun. 1812. The additions made by Ballard, are referred to him in my quotations.

Michaelis. Commentaries on the Laws of Moses, by the late Sir John David Michaelis, K. P. S. F. R. S. &c. Translated from the German by Alexander Smith, D. D. &c. 4 vols. 8vo. London. 1814.

Monthly Journal of Medicine. Containing selections from European Journals, the Transactions of Learned Societies, &c. (Commenced in 1823.) 1 vol. 8vo. Hartford. 1823.

Morgagni. The seats and causes of Diseases, investigated by Anatomy, &c. Translated from the Latin of John Baptist Morgagni, Chief Professor of Anatomy, and President of the University at Padua. By Benjamin Alexander, M. D. 3 vols. 4to. London. 1769.

Morgagni, (Jo. Baptistæ.) Opuscula Miscellanea. Folio. Venetiis. 1763.

Moseley. A Treatise on Tropical Diseases, on Military Operations, and on the Climate of the West Indies. By Benjamin Moseley, M.D. &c. 4th edition, 8vo. London. 1803.

Murray. A System of Chemistry; by John Murray, Lecturer on Chemistry, and on Materia Medica and Pharmacy. 4 vols. 8vo. Edinburgh. 1809.

New-England Journal of Medicine and Surgery, &c. 8vo. Boston. 11 vols. (1812 to 1823.)

New-York Medical and Physical Journal. Edited by Drs. Francis, Dyckman, and Beck. (Commenced in 1822. 1 vol. and 2 Nos.)

New-York Medical Repository. Edited at various times by Drs. Mitchill, Miller, Smith, Pascalis, Akerly, Manley, and Drake. 22 vols. 8vo. New-York. (1797 to 1822.)

Orfila. A General System of Toxicology; or, a treatise on poisons drawn from the mineral, vegetable, and animal kingdoms, considered as to their relations with Physiology, Pathology, and Medical Jurisprudence. By M. P. Orfila, M. D. of the Faculty of Paris, Professor of Chemistry and Natural Philosophy. Translated from the French, by John A. Waller. 2 vols. 8vo. London. 1816-17.

Orfila's Directions. Directions for the treatment of persons who have taken poison, and those in a state of apparent death: together with the means of detecting poisons and adulterations in wine; also of distinguishing real from apparent death. By M. P. Orfila. Translated from the French, by R. H. Black, Surgeon. *First American edition.* 12mo. Baltimore. 1819. I quote this as *Orfila's Directions*, to distinguish it from the former.

Paris' Pharmacologia, or the History of Medicinal Substances, with a view to establish the Art of Prescribing, and of composing Extemporaneous formulæ upon fixed and scientific principles, &c. by John Ayrton Paris, M. D. F. L. S. M. R. S. &c. From the Fourth London edition. 8vo. New-York. 1822.

Pelletan. Clinique Chirurgicale ou Memoirs et Observations de Chirurgie Clinique, et sur d'autres objets relatifs a l'art de Guerir, par Ph. J. Pelletan, Chirurgien Consultant de ll. m. m. Imper. et Royal, &c. &c. 3 vols. 8vo. Paris. 1820. The conclusion of the first volume contains several medico-legal memoirs.

Percival's Essays. Essays Medical, Philosophical, and Experimental. By Thomas Percival, M. D. &c. &c. Vol. 1. Fourth edit. 8vo. Warrington. 1788.

Percival's Medical Ethics. Medical Ethics; or, a Code of Institutes and Precepts, adapted to the professional conduct of physicians and surgeons, &c. &c. By Thomas Percival, M.D. F. R. S. London and Edinburgh, &c. 8vo. Manchester. 1803.

Philosophical Transactions of the Royal Society of London, from their commencement in 1665 to the year 1800; abridged, with notes and biographical illustrations, by Charles Hutton, LL. D. F. R. S. George Shaw, M.D. F. R. S. and F. L. S. and Richard Pearson, M. D. F.S.A. London. 1809. 18 vols. 4to. *My references are all made to the original edition, and not to the paging as it stands in this abridgment.*

Quarterly Journal of Foreign Medicine and Surgery, and of the sciences connected with them. 4 vols. 8vo. London. Commenced in 1818. (1818 to 1823.)

Republic of Letters. Present state of the (conducted by Andrew Reid.) 18 vols. 8vo. London. (1728 to 1736.)

Rose. See Marc.

Rush. Medical Inquiries and Observations upon the Diseases of the Mind. By Benjamin Rush, M. D. Professor of the Institutes and Practice of Medicine, and of Clinical Practice in the University of Pennsylvania. 8vo. Philadelphia. 1812.

Rush's Introductory Lectures. Sixteen Introductory Lectures to courses of Lectures upon the Institutes and Practice of Medicine, with a Syllabus of the latter, &c. By Benj. Rush, M.D. Professor, &c. 8vo. Philadelphia. 1811. (The sixteenth Lecture is on the study of Medical Jurisprudence.)

Schlegel. Collectio Opusculorum Selectorum ad Medicinam forensem spectantium, curante Dr. Joan. Christ. Traugott Schlegel, Medico apud Longo-Salissenses. 6 vols. 12mo. Leipsiæ. 1785—1791. As this work contains many dissertations which I have referred to, merely by the names of the authors, I will here present the contents of each volume.

VOL. I.

1. *El Frider. Hiesteri* diss. de principum cura circa sanitatem subditorum.
2. *Burcard. Dav. Maucharti* diss. de inspectione et sectione legali, harumque exemplo speciali. R. *I. Mich. Salzer.*
3. *Phil. Conr. Fabricii* diss. exhib. praecipuas cautiones in sectionibus et perquisitionibus cadaverum humanorum pro usu fori obseruandas. R. *Vrb. Fr. Bened. Bruckmann.*
4. *Ioan. Traugott Adolphi* diss. de infanticidii notis sectione legali detegendis. Resp. *Henr. Christoph. Dreyer.*
5. *Laurent. Heisteri* diss. de summe necessaria inspecti one cordis vasorumque majorum sub legali infantum sectione. R. *I. Dan. Farenholz.*

6. *Ioan. Christoph. Andr. Mayeri* diss. sistens praecipua experimenta de effectibus putredinis in pulmones infantum ante et post partum mortuorum, subjunctis nouis quibusdam experimentis circa pulmones infantum ante partum mortuorum institutis. Resp. *I. Godofr. Reimann.*
7. *Henr. Frider. Delii* diss. de sugillatione quatenus infanticidii indicium. Resp. *M. Ignat. Berger.*

VOL. II.

8. *Laurentii Heisteri* diss. quá partus tredecimestris pro legitimo habitus proponitur, et simul, partui nullum certum tempus in universum tribui posse, ostenditur. Resp. *Ioan. Gerard. Wagner.*
9. *Rud. Augustin. Vogel.* diss. de partu serotino valde dubio. Resp. *Ioan. Christoph. Harrer.*
10. *Ioan. Zacchariae Platneri* progr. quo ostenditur, medicos de insanis et furiosis audiendos esse.
11. *Ioan. Christophor. Pohlii* progr. de lethalitate vulnerum lienis.
12. *Phil. Conr. Fabricii* diss. de lethalitate vulnerum ventriculi secundum principia anatomica et medica expensa. Resp. *Aegid. Iungen.*
13. *Petr. Imman. Hartmanni* diss. sistens medicam tormentorum aestimationem. Resp. *Frider. Adolph Detleffsen.*

VOL. III.

14. Dr. *Ernesti Gottl. Bose,* diss. prior de diagnosi vitæ fœtus et neogeniti. Resp. *Christoph Godofr. John.*
15. Dr. *Ern. Gottl. Bose,* diss. posterior de diagnosi vitæ fœtus et neogeniti. Resp. *Christl. Betke.*
16. Dr. *Ern. Gottl. Bose,* Progr. de judicio vitæ ex neogenito putrido.
17. *Joan. Dan. Reisseissen,* diss. de veneficio doloso. Auct. et Resp. *Joan. Franc. Ehrmann.*
18. *Joan. Franc. Ehrmann,* de veneficio culposo.

VOL. IV.

19. Dr. *Ern. Gottl. Bose,* Progr. de diagnosi veneni ingesti et sponte in corpore geniti.
20. Dr. *I. Dan. Metzger,* Progr. de veneficio caute dijudicando.
21. Dr. *Ern. Gottl. Bose,* diss. de vulnere per se lethali homicidam non excusante. Resp. *Ioan. Christ. Müller.*
22. Dr. *Ern. Gottl. Bose,* Progr. de sugillatione in foro caute diiudicanda.
23. Dr. *Phil. Conr. Fabricii,* Progr. quo caussæ infrequentiæ vulnerum lethalium præ minus lethiferis ex fabrica corporis humani anatomica et situ partium præcipue eruuntur.
24. Dr. *Joan. Ern. Hebenstreit,* Progr. de corpore delicti, medici secantis culpa, incerto.
25. Dr. *Christ. Gottfried. Gruneri,* diss. de causis melancholiæ et maniæ dubiis in medicina forensi caute admittendis. Resp. *Martin. Ludov. Wittwerk.*
26. Dr. *Burchard. Dav. Mauchart,* diss. de lethalitate per accidens. Resp. *Sigism. Palm.*
27. Dr. *Joan. Guilelm. Werner,* diss. qua evincitur, medicinam forensem præter differentiam, vulnere in absolute lethalia et per accidens distinguentem, nullam prorsus agnoscere. Resp. *Dav. Schulz.*
28. Dr. *Joan. Torkos,* diss. de renuntiatione lethalitatis vulnerum ad certum tempus haud adstringenda.
29. Dr. *Ioan. Bernard. Schnobel,* diss. de partu serotino in medicina forensi temere nec affirmando nec negando.
30. Dr. *Ant. Guilielm. Plaz,* Progr. de sostris.

VOL. V.

31. Dr. *Abrah. Vater* diss. qua valor et sufficientia signorum infantem recens natum vivum aut mortuum editum arguentium ad dijudicandum infanticidium examinantur. Resp. *Ioh. Aug. Süssemilch.*

32. Dr. *Christ. Frid. Jaeger* diss. sistens observationes de fœtibus recens natis, jam in utero mortuis et putridis, cum subjuncta epicrisi. Resp. *Theoph. Conr. Christ. Storr.*

33. *Ejusd.* diss. qua casus et annotationes ad vitam fœtus neogoni dijudicandam facientes proponuntur. Resp. *Hercul. Dav. Hennenhofer.*

34. Dr. *Andr. Ottomar. Goelicke* specim. quo demonstratur, partum octimestrem vitalem esse et legitimum. Resp. *Georg. Frider. Stabel.*

35. Dr. *Georg. Aug. Langguth* diss. de fœtus ab ipsa conceptione animato, ad art. 123. C.C.C. Resp. *Christ. Gottl. Otto.*

36. Dr. *Dan. Wilh. Triller* diss. de mirando cordis vulnere post XIV. demum diem lethali. Resp. *Ioan. Traugott. Weitzmann.*

VOL. VI.

37. Dr. *Ludov. Henr. Leon. Hilchen* diss. de vulnerum in intestinis lethalitate. Resp. *Frider. Ludov. Nitsch.*

38. Dr. *Christ. Gottl. Ludwig* Pr. de luxatione vertebrarum colli a medico forensi circumspecte disquirenda.

39. Dr. *Petr. Imman. Hartmann* diss. de controversa pulmonum in declarandis infanticidiis æstimatione. Resp. *Mich. Orgovany de Fagaras.*

40. Dr. *Ioan. Henr. Schulze* diss. qua problema, an umbilici deligatio in nuper natis absolute necessaria fit, in partem negativam resolvitur. Resp. *Ioan. Car. Dehmel.*

41. Dr. *Christ. Ludov. Schael* diss. de funiculi umbilicalis deligatione non absolute necessaria.

42. Dr. *Philipp. Fischer* diss. an deligatio funiculi umbilicalis in neonatis absolute necessaria sit?

43. *Car. Aug. de Bergen* diss. de lethalitate vulnerum hepatis. Resp. *Rud. Frider. Riedel.*

Silliman. The American Journal of Science and Arts, conducted by Benjamin Silliman, Professor of Chemistry, Mineralogy, &c. Yale College, &c. &c. 6 vols. 8vo. New-Haven. (1818 to 1823.)

Smith. The Principles of Forensic Medicine, systematically arranged and applied to British practice. By John Gordon Smith, M. D. 8vo. p. 503. London edition. 1821.

Stalpartii Van Der Wiel. Observationum Rariorium Medic. Anatomic, Chirurgicarum Centuria, prior and posterior. 2 vols. 12mo. Lugduni Batavorum. 1687.

State Trials. A complete collection of State Trials, and Proceedings for High Treason, and other crimes and misdemeanors. The fourth edition. With a preface by Francis Hargrave, Esq. 11 vols. folio. 1766 to 1781. N.B. *Emlyn's and Howell's editions* of the State Trials have also been consulted, and a few references will be found to each of them.

Struve. A practical Essay on the art of recovering suspended animation, together with a review of the most proper and effectual means to be adopted in cases of imminent danger. Translated from the German of Christian Augustus Struve, M. D. 12mo. Albany, 1803.

Ure. A Dictionary of Chemistry on the basis of Mr. Nicholson's, &c. by Andrew Ure, M.D. Professor of the Andersonian Institution, Glasgow, &c. First American edition, with notes by Prof. Hare and Dr. Bache. 2 vols. 8vo. Philadelphia. 1821.

Valentini (Michaelis Bernhardi) PANDECTÆ MEDICO-LEGALES sive Responsa Medico-Forensia, &c. &c. 2 vols. 4to. Francofurti ad Moenum. 1701.

Valentini (M. B.) Archiatri Hasso-Darmstatini. Phil. et Med. P. P. &c. &c. NOVELLÆ MEDICO-LEGALES, &c. &c. cum Supplemento Pandectarum Medico-Legalium. 4to. Francofurti ad Mœnum. 1712.

Zacchias. Pauli Zacchiæ, Romani, totius status Ecclesiastici Protomedici generalis, QUESTIONUM MEDICO-LEGALIUM. Tomi tres, olim aucti et emendati a viro celeberrimo Joh. Daniel Horstio, nunc illustrati, emendati atque audacti a Georgio Franco, &c. &c. Folio. Francofurti ad Mœnum. 1688.

INTRODUCTION.

MEDICAL JURISPRUDENCE, Legal Medicine, or Forensic Medicine, as it is variously termed, is that science which applies the principles and practice of the different branches of medicine to the elucidation of doubtful questions in courts of justice. By some authors it is used in a more extensive sense, and also comprehends MEDICAL POLICE, or those medical precepts which may prove useful to the legislature or the magistracy. I shall employ it at this time in its restricted sense.*

Traces of this science are to be found as early as the institution of civil society. Thus, in the Jewish law, indications of it may be observed in the distinction established between mortal wounds and those not so, and in the inquiries prescribed in cases of doubtful virginity. Among the Egyptians, according to Plutarch, it was ordained, that no pregnant woman should suffer afflictive punishment—while the Romans, even from that early period in which Numa Pompilius flourished, grounded many of their laws on the authority of ancient physicians and philosophers. *Propter auctoritatem doctissimi Hippocratis*, is a phrase frequently met with in their decisions,† and the emperor Adrian, in extending the term of legitimacy from ten months, (the period fixed by the Decemvirs,) to eleven, was influenced, in so doing, by the prevailing sentiments of the physiologists of that day.‡ Some detached, but striking medico-legal facts, are also mentioned by the Roman historians. Thus, the bloody remains of Julius Cæsar, when exposed to public view, were examined by one Antistius, who declared that out of twenty-three wounds which had been received, but one was mortal, and that had penetrated the thorax, between the first and second ribs. The body of Germanicus was also inspected, and by indications conformable to the superstitions of the age, it was decided that he had been poisoned.*

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* If a general term be necessary to include both these sciences, I should prefer that used by the Germans, viz. STATE MEDICINE.

† Belloc, p. 6.

‡ Foderè. Introduction, p. xiv.

The code of Justinian contains many provisions appertaining to this science, which we shall have frequent occasion to quote in the subsequent pages. Some of these provisions indeed are incorporated into the laws of almost every civilized country at the present day.

All the laws of the ancients, however, and all the facts drawn from their history, are to be considered as merely the first glimmerings of knowledge on this subject—and knowledge, too, founded on the imperfect diagnostics which medicine afforded at that early period. It was never ordained that physicians should be examined on any trial, until after the middle ages, and we are indebted to the emperor Charles the Fifth of Germany, for the first public enactment prescribing it as necessary, and thereby recognizing its utility and importance. In the celebrated criminal code which was framed by him at Ratisbon, in 1532, and which is known by the name of the "*Constitutio Criminalis Carolina*," or the Caroline code, it is ordained, that the opinion of medical men shall be formally taken in every case where death has been occasioned by violent means—such as child-murder, poisoning, wounds, hanging, drowning, the procuring of abortion, and the like.

"The publication of such a code very naturally awakened the attention of the medical profession, and summoned numerous writers from its ranks." It was the first regular commencement and origin of legal medicine, and it required only such an enactment to apprehend the utility of which it was susceptible.

The kings of France soon became aware of the value of similar institutions. In 1556, Henry II. promulgated a law, by virtue of which, death was inflicted on the female who should conceal her pregnancy, and destroy her offspring. In 1606, Henry IV. presented letters-patent to his first physician, by which he conferred on him the privilege of nominating two surgeons in every city and important town, whose duty it should exclusively be to examine all wounded or murdered persons, and to make reports thereon; and, in 1667, Louis XIV. formally declared, that no report should be valid unless it had received the sanction of at least one of these surgeons.* At a subsequent period (1692) physicians were by law associated with surgeons in these examinations.

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* Foderè. Introduction, p. xxiv.

The writers who have investigated the science of Medical Jurisprudence are numerous, and many of them have displayed great talent and acuteness. Some have noticed it as a system, while others have examined detached parts. I shall content myself with mentioning the more distinguished, as a catalogue of all these authors, with the titles of their works, would uselessly fill several pages.

Fortunatus Fidelis is probably the earliest writer on the science. He was an Italian, and his work, "De Relationibus Medicorum," was published in 1602, at Palermo. Paulus Zacchias soon followed him, in his great work, entitled, "Questiones Medico-Legales," which appeared at Rome between 1621 and 1635.† This distinguished man rose to great eminence in his profession, and was physician to Pope Innocent the Tenth. He died in 1659, in the 75th year of his age. His treatise on legal medicine, although partaking of the superstition of the age in which he lived, is still a most valuable record of facts, and a permanent monument of the talents of the author. The following is a general outline of the contents of the first volume. First Book. Age. Legitimacy. Pregnancy. Superfœtation and Moles. Death during delivery. Resemblance of children to their parents.—Second Book. Dementia. Poisoning.—Third

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* Fodeié. Introduction, p. xxxii.

† Life of Zacchias, prefixed to his *Questiones. M. L.*

Book. Impotence. Feigned diseases. The plague and contagion.—Fourth book. Miracles. Rape.—Fifth book. Fasting, Wounds. Mutilation. Salubrity of the air, &c. The second volume is principally filled with a discussion of casuistical questions.

In Germany, Bohn was among the earliest writers, but his treatise is confined to a consideration of wounds. The *Pandects* of Valentini, which appeared in 1702, and which were shortly followed by his *Novellæ*, form a very complete and extensive retrospect of the opinions and decisions of preceding writers on legal medicine. They consist, indeed, of medico-legal cases and the consultations of distinguished physicians, and of medical and legal faculties on them. Alberti, Zittman, Teichmeyer, Fazelius, Goelicke, Hebenstreit, Plenck, Daniel, Sikora, Ludwig, and Metzger, are also German authors of eminence in this branch of learning. But one of the most valuable and comprehensive collections that has ever appeared, is that edited by Schlegel. It consists of upwards of forty dissertations on various parts of medical jurisprudence, written by Germans at different periods during the eighteenth century, and is alike honourable to the national character, and the individuals whose investigations appear in it.

Foderè, in his sketch of the history of the science in France, considers Ambrose Paré as the earliest writer on it in that country. His chapter on Reports, and his observations on feigned diseases, indicate the talents for which he is still famous at the present day; and in such estimation were his works held in his native country, that for more than a century they formed the sole guide of the French surgeon. To him succeeded Gendri in 1650; Blegni in 1684, and Deveaux in 1693 and 1701. Their works were particularly intended for the benefit of surgeons, from whom, as I have already stated, the examiners in medico-legal cases were selected.

Louis is, however, considered, and with great justice, as the individual who first promulgated a just idea of the science to his countrymen. He investigated several important points with great ability—such as the certainty of the signs of death, protracted gestation, drowning, and the proofs that distinguish hanging through suicide, from hanging as an act of murder. His consultations also in various cases, and which are preserved in the Causes Célèbres, abound in various and instructive learning. Some of his opinions gave rise to animated discussions, and thus excited public attention to these subjects generally. Winslow, Lorry, Lafosse, and Chaussier, also deserve notice among the French writers; while towards the conclusion of the eighteenth century, Professor Mahon, with several others, published in the "*Encyclopedie Methodique,*" copious dissertations on Medical Jurisprudence.*

In 1796, Foderè published the first edition of his work, in three octavo volumes, under the title of "*Les lois eclairèes par les sciences physiques, ou Traitè de medicine legale et d'hygiène publique.*" This learned physician is a resident of Strasburg, and the author of several other treatises of deserved reputation. In 1807, the system of Mahon, late Professor of Legal Medicine, and the history of Medicine in the school of Medicine at Paris, appeared, with notes, by M. Fautrel, and about the same time, Belloc, a surgeon at Agen, published his sensible and useful treatise in one volume. Marc, in 1808, presented a translation from the German, of the Manual of Rose on Medico-Legal Dissection, and enriched it with valuable notes, besides adding two most instructive dissertations—one on the *docimasia pulmonum*, and the other on *death by drowning.* In 1812, Ballard published a translation, also from the German, of Metzger's Principles of Legal Medicine. This work is peculiarly valuable for the great learning displayed in its notes, and the opportunity thus afforded of becoming acquainted with the sentiments of authors whose writings are either inaccessible, or in some degree antiquated.

After bestowing great labour, during several years, a second edition of his treatise was published by Foderè, in

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* Foderè. Introduction, p. xxxvii, &c.

1813. It is now extended to six volumes—four of these on legal medicine, and two on medical police. Without proceeding to minute criticism, I may remark, that it is in many respects the most valuable systematic work on the science in the French language. I have made frequent use of it in the following pages.

After a few years, there appeared in Paris one of the most original publications that the present age has yet afforded, I refer to the system of Toxicology by Orfila, a Spaniard by birth, but I believe naturalized, or, at least, permanently resident in France. This is copious, beyond all former treatises, in original experiments, and it has done much to increase our knowledge of the action and the tests of individual poisons. In 1821, Professor Capuron published on legal medicine, so far as it relates to midwifery.

The first work, professing to treat of Medical Jurisprudence, that appeared in England, was the production of Dr. Farr. This was in 1788, and in his preface he mentions that it is derived from Fazèlius' Elements of Forensic Medicine. It is brief and imperfect, extending only to one hundred and forty duodecimo pages. It arrived at a second edition in 1814. The "*Medical Ethics*," of Percival, contain some useful facts, and Dr. William Hunter, in his essay "*on the uncertainty of the signs of murder in the case of bastard children*," examined a most important and leading subject in medical jurisprudence. In 1815, Dr. Bartley, of Bristol, published a few essays on some points connected with midwifery.

Dr. Male, of Birmingham, in 1816, presented the first English original work of any magnitude or value on medical jurisprudence. It has evidently aided in drawing the public attention in Great Britain to this science. In 1821, Dr. John Gordon Smith published his excellent treatise, entitled "*The principles of Forensic Medicine, systematically arranged and applied to British practice.*" And I may be permitted to bear my humble testimony to the talents and good sense displayed in it. In its application to the English laws, and in its illustrations by individual cases, it is strictly an original work. The last and most copious systematic work in the English language, has been already mentioned. Its authors are Dr. Paris and J. S. M. Fonblanque, Esq. and is comprised in three octavo volumes. As it is dedicated, by permission, to the Earl of Eldon and to Sir Henry Halford, Bart. the President of the Royal College of Physicians, of London, it may be presumed that these dignified characters are aware of the importance of the science, and that the sneers so freely and flippantly uttered, both in and out of parliament, against the Fox ministry, for founding a chair of medical jurisprudence in the university of Edinburgh, will no longer be heard.

To the professorship just alluded to, Dr. Andrew Duncan, junior, was appointed. *He was the first professor of medical jurisprudence in any British university.* His venerable father had for some years previous urged its importance on the public, and even delivered, I believe, a course of private lectures, but it was not until 1803 that Dr. Duncan, junior, received his appointment.

If the publications contained in the Edinburgh Medical and Surgical Journal, of which he is the editor, are to be deemed any criterion on this subject, I should not hesitate to declare my decided conviction, that Dr. Duncan is, at present, the ablest and most learned medical jurist in Great Britain. The numerous and valuable cases, essays, and reviews published from time to time in the Journal, have almost supplied the want of systematic works; and if the literature of that country has been deficient in the latter, she has at least furnished her full proportion of the former.—Lectures are now delivered on the science in London, Edinburgh, and Glasgow.

This brief outline may suffice to give some idea of the ardour with which medical jurisprudence is investigated in Europe. It forms the study of systematic writers—either as a whole, or in parts, and is the leading subject in many periodical publications.*

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* A copious list of authors on the science, will be found in the notes to Metzger, p. 285 to 306 – in Brendel, p. 61, and in the preface to Hebenstreit.

In turning to my native country, I must premise, that as our literature has been in a great degree derived from Great Britain, so the objects of study will frequently be those that are most popular there. And as Medical Jurisprudence has only within a few years met with its deserved attention in that country, it may in some degree account for the little interest which it has here excited. We have, however, a few publications to notice. In 1810, the venerable and distinguished Dr. Rush delivered an Introductory Lecture in the university of Pennsylvania, (and which was published in 1811) in which he dwelt in an eloquent and impressive manner on the importance of the study. After stating the various subjects comprehended under it, he dilated particularly on insanity, and showed its application in medico-legal cases. In the conclusion, he thus forcibly establishes the utility of the science. "To animate you to apply to the study of all the subjects enumerated in the introduction to our lecture, I beg you to recollect the extent of the services you will thereby be enabled to render to individuals and the public: fraud and violence may be detected and punished; unmerited infamy and death may be prevented; the widow and the orphan may be saved from ruin; virgin purity and innocence may be vindicated; conjugal harmony and happiness may be restored; unjust and oppressive demands upon the services of your fellow citizens may be obviated; and the sources of public misery in epidemic diseases may be removed, by your testimony in courts of justice."*

In 1819, Dr. Thomas Cooper, formerly a judge in Pennsylvania, and now president of the college of South Carolina, republished, in one volume, several English tracts on medical jurisprudence, viz. Farr, Dease, Male, together with Haslam on Insanity. To these he added copious notes, and a digest of the law relating to insanity and nuisance. Having had occasion to differ with Dr. Cooper on some medico-legal points, my opinion will not be misconstrued, I trust, when I state my conviction, that he has done much by this publication to promote the study of the science in the United States. From his standing in the legal profession, he has attracted the attention of lawyers to it in a degree which a physician could scarcely hope for. He has also strongly illustrated the importance of the subject to both professions; to the promotion of the ends of justice, and to the welfare of our free communities.

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* Rush's Introductory Lectures, p. 392.

These, with the exception of some inaugural dissertations, and cases and essays in medical journals, constitute, so far as my information extends, the American publications on the science.

Our lecturers have been rather more numerous. The first that ever delivered a course on it before an American audience, was the late James S. Stringham, M.D. of New-York. With feelings which will be readily appreciated, when I state that my first impulse towards the study was derived from attendance on Dr. Stringham's lectures, I was desirous of commemorating his name in these introductory remarks, and I have been enabled to do so, through the kindness of his successor.

Dr. Stringham was born in the city of New-York, of respectable parents, whose circumstances in life happily enabled them to furnish to their son the opportunities of a liberal education. He prosecuted his classical studies in Columbia College, and was graduated there in 1793. After this, he immediately entered upon a course of medical education, under the care of the late Dr. S. Bard and Dr. Hosack, and diligently attended, for several years, to all the branches of medicine then taught in New-York. He subsequently repaired to Edinburgh, became a student in the university, and in 1799 received from it the degree of M.D.

Shortly after his return to his native country, he was elected Professor of Chemistry in Columbia College, and for several years delivered lectures on that science. Not satisfied, however, with these exertions, and anxious for a more extended sphere of usefulness, he voluntarily prepared a course of lectures on Legal Medicine. To the students who attended him, this proved a source of great gratification and instruction, and its utility was readily acknowledged.

Having long laboured under an alarming organic disease of the heart, and finding his constitution materially impaired, Dr. Stringham resigned his office as Professor of Chemistry, in Columbia College; but, upon the union of the medical faculty of that college, with the college of Physicians and Surgeons, he was induced to accept the Professorship of Medical Jurisprudence. In this station he continued until his death, which happened at the island of St. Croix, (whither he had repaired for the benefit of his health,) on the 29th of June, 1817.

Besides his inaugural dissertation, "*De absorbentium systemale,*" Dr. Stringham was the author of several essays and papers in the medical journals of the day. He published in the *New-York Medical Repository*, an account of the efficacy of Digitalis purpurea in allaying excessive action of the sanguiferous system—a description of a remarkable species of intestinal vermes—an account of the violent effects of corrosive sublimate—and a case of hydrocephalus; in the *Philadelphia Medical Museum*, a paper on the effects of mercury, in a case of syphilis; and in the *Edinburgh Medical and Surgical Journal*, a paper on the yellow fever of America.

A syllabus of the lectures of Professor Stringham is contained in the American Medical and Philosophical Register.* The subjects noticed by him were as follows: Age—propriety of the Cæsarean operation—virginity and rape—concealed pregnancy—pretended pregnancy—quickening—abortion—superfœtation—monstrosity—hermaphrodites—impotence and sterility—feigned diseases—concealed diseases—poisons—medico-legal dissection—wounds—infanticide—death from hanging and drowning—medical etiquette—effects of particular manufactories on health—salubrity of water.

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* Volume 4, p. 614.

Dr. John W. Francis was appointed Professor of Medical Jurisprudence on the decease of Dr. Stringham; but, by a subsequent arrangement, the professorship was abolished. Those parts, however, which relate to midwifery, are still taught from the obstetrical chair.

In 1815 I was requested to deliver a course of lectures on the science at the Western Medical College, and, from the winter of that year, have annually, with one exception, attended to this duty. Not long after, Dr. Walter Channing was appointed Professor of Midwifery and Medical Jurisprudence, in Harvard University. Other medical schools are also devoting proper attention to it, and I may add, that a course of private lectures was delivered some years since, in Philadelphia, by Dr. Charles Caldwell, now of Transylvania University.

It only remains to offer some observations on the arrangement that has been adopted in the present work.

Some writers endeavour to divide the subjects according to the courts before which they may arise, and thus devote separate chapters to civil and criminal cases. It will, however, be readily perceived, that this must render the study confused. Pregnancy, for example, may be a subject of inquiry, on a plea for a delay of execution—or on the application of an heir for his property. In both instances its signs require examination. So also with insanity, and several other topics. It will hence only lead to repetition to adopt this division. Foderé has escaped from the difficulty, by including these subjects under the title of "*Medicine Legale Mixte*," applicable both to civil and criminal cases; but this is evidently an evasion. Dr. Gordon Smith arranges his subjects into three parts: 1. Questions that regard the extinction of human life; 2. Questions arising from injuries done to the person, not leading to the extinction of life; and, 3. Disqualifications for the discharge of social or civil functions.

I must confess that I have found a confusion to attend all these attempts at arrangement, which is probably insurmountable. The subjects comprehended under the science, are not of a nature to admit of a division similar to that proposed by either of the above writers. I have preferred noticing each head of discussion separately and independently. Before a legal tribunal they must be thus investigated, and the nearer we approach in our studies to this, the easier will be their application to practice.

The general arrangement is thus, I apprehend, not a matter of great moment, but on taking up a distinct topic, the first question which I have proposed to myself, has been the following: *How can the examination of this point come before a judicial tribunal?* Having ascertained and stated this, I proceed to notice the physiological, pathological, or chemical facts, that are necessary to be known in the supposed case—advert to the difficulties to be encountered in the investigation—and offer, if necessary, some observations on the conformity of the law to the present state of medical knowledge. A collection of detached essays of this description (for they evidently are detached in their subjects and in their application,) must prove in a great degree useful, both to the lawyer and the physician, since it enables them, in their respective capacities, to review the information that is immediately applicable to a particular instance before them. If, in the opinion of enlightened men of these professions, I have effected this in some tolerable degree, my highest ambition will be gratified.*

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* Some subjects of minor importance have been omitted in the present work, from a fear of enlarging it to an inconvenient size. They are, however, of such a nature, as to admit of their examination with perfect propriety in a treatise on Medical Police.

MEDICAL JURISPRUDENCE.

CHAPTER I.

FEIGNED DISEASES.

Objects for which diseases are feigned. Diseases most readily feigned. General rules for their detection. Diseases that have been feigned. Alteration of the pulse—altered state of the urine—hæmaturia—incontinence of urine—suppression of urine—maiming and deformity—dropsy and tumours of various kinds—excretion of calculi—ulcers—hæmoptysis—hæmatemesis—jaundice and cachexia—fever—pain in various parts—syncope and hysteria—diseases of the heart—apoplexy—paralysis—epilepsy—convulsions—catalepsy—nostalgia—near-sightedness—ophthalmia—blindness—deafness, with or without dumbness. Of impostors. Feigned abstinence.

Diseases are generally feigned from one of three causes—fear, shame, or the hope of gain. Thus the individual ordered on service, will pretend being afflicted with various maladies to escape the performance of military duty—the mendicant, to avoid labour, and to impose on public or private beneficence—and the criminal, to prevent the infliction of punishment. The spirit of revenge, and the hope of receiving exorbitant damages, have also induced some to magnify slight ailments into serious and alarming illness.

The extent and finish to which the art of feigning diseases is carried, are various, and differ in different countries. Of his own nation, Foderè observes, "that it is at present brought to such perfection, as to render it as difficult to detect a feigned disease, as to cure a real one."*

Against such impositions, the police of every well-regulated country should direct its energies. A severe injury may not only be inflicted on individuals through them, but the public morals may be deteriorated. In almost every age, impostors have sprung up, who affect various maladies, and operate on the superstition or the curiosity of the vulgar. And even the higher ranks of society, from motives as unworthy, have occasionally, like the courtiers of Dionysius and Louis XIV. given a sanction to such practices.

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* Foderè, vol. ii. p. 452. This remark, it will be observed, was made at a time when the conscription was in full force in France.

It will readily be observed, that a knowledge of this subject may frequently be necessary both in civil and criminal cases, and also in the due administration of MEDICAL POLICE. To prevent the necessity of repetition, I shall consider it at length under the present division of our subject.

All maladies are not equally capable of being feigned. It is difficult to pretend those, whose diagnostic symptoms are certain and established, and whose natural course it is to effect a great change in the system, and to alter the various secretions and excretions in a perceptible manner. But such, on the contrary, as are variable and uncertain in their symptoms, and characterised by little or no change in the external appearance, or where the correctness of an opinion depends much on the statement which the patient may give, are most liable to be feigned. Of the first class may be named inflammations, continued fevers, purulent expectoration, &c. and of the last, insanity, epilepsy, and pain. Not unfrequently, however, various substances are used to aid in misleading the examiner, and thus the entire skill of a medical man is often called into exercise, to ascertain the real state of the patient.

Zacchias, in his elaborate and learned work, has given five general rules for the detection of feigned diseases, which are so discriminating as to have received the sanction of most succeeding writers. A detail of these will illustrate their universality of application, and the ingenuity of their author.

1. The first is, that the physician must, in all suspected cases, inquire of the relatives and friends of the suspected individual, what are his physical and moral habits. He must ascertain the state of his affairs, and inquire what may possibly be the motive for feigning disease—particularly whether he is not in immediate danger of some punishment, from which this sickness may excuse him. It was on this principle, he observes, that Galen detected the imposture of his servant, who, when ordered to attend his master for a long journey, complained of an inflammation of the knee. He inquired into the habits and character of the slave, and ascertained that he was much attached to a female, whom this journey would compel him to leave. This, combined with the little alteration that so painful an affection as the one named, induced, led him to examine the part, and at last to ascertain that the swelling was occasioned by the application of the *thapsia* or *bastard turbith*, and which being prevented, the tumour disappeared.

2. Compare the disease under examination, with the causes capable of producing it; such as the age, temperament, and mode of life of the patient. Thus artifice might be suspected, if a person in high health, and correct in his diet, should suddenly fall into dropsy or cachexia; and again, if insanity should suddenly supervene, without any of its premonitory symptoms. It is contrary to experience to find such diseases occur without some previous indications.

3. The third rule is derived from the aversion of persons feigning disease to take proper remedies. This indeed will occur in real sickness; but it rarely happens when severe pain is present. Any thing

that promises relief, is generally acceptable in such cases. Those, on the contrary, who feign, delay the use of means. Galen, (says Mahon,*) thus ascertained deceit in another case. An individual complained of a violent cholic, on being summoned to attend an assembly of the people. Suspecting artifice, he prescribed only a few fomentations, although this same person had not long before been cured of the same complaint by the use of *philonium*. Of this, however, he never spake, nor indeed seemed in the least anxious for medical aid.

4. Particular attention should be paid to the symptoms present, and whether they necessarily belong to the disease. An expert physician may thus cause a patient to fall into contradiction, and lead him to a statement which is incompatible with the nature of the complaint. To effect this, it is necessary to visit him frequently and unexpectedly.

5. The last direction is to follow the course of the complaint, and attend to the circumstances which successively occur. Thus the inflammation of the knee above noticed should have produced fever, and increased in violence, according to the common course, when no remedies are applied.†

Before proceeding to notice separately the various diseases that may be feigned, it will be proper to advert to a species of simulation, mentioned by Zacchias, under the name of *simulatio latens*. By this, he understands a case in which disease is actually present, but where the symptoms are falsely aggravated, and greater sickness is pretended than really exists. This may be more difficult of detection in some respects, and it requires, like the cases above noticed, the skill of the physician, and that, too, of one experienced in the history of disease, to guide aright. Generally speaking, it will be his duty to steer a middle course between too great incredulity and too great confidence, and where the interests of a third person are not liable to be affected, to lean towards the patient. I can however imagine, that cases have occurred, in which disease has been magnified in order to increase damages, or to revenge insult. Here the conduct of the medical examiner must be cautious, and he should carefully apply the rules already laid down.‡

The following diseases have at various times been feigned: alteration of the pulse; altered state of the urine; hæmaturia; incontinence of urine; suppression of urine; maiming and deformity; dropsy and tumours of various kinds; excretion of calculi and various foreign matters; ulcers; hæmoptysis; hæmatemesis; jaundice and cachexia; fever; pain in various parts; syncope and hysteria; diseases of the heart; apoplexy; paralysis; epilepsy; convulsions; catalepsy; nostalgia; near-sightedness; ophthalmia; blindness and deafness, with or without dumbness.

On examining this list, it will be found that the various diseases are generally referable to two classes—external infirmities, real in one

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[*] Mahon, vol. i. p. 332.

[†] Zacchias, tom. i. p. 289.

[‡] "Flagrantior æquo
Non debet dolor esse viri, nec vulnere major." *Juvenal, Sat.* 13.

sense, but arising from factitious and culpable causes—and secondly, internal ones, whose origin is uncertain, and which from their nature produce great commiseration on the part of observers.*

The *pulse* is sometimes found extremely weak, and occasionally none is perceived at the wrist.† Should deceit be suspected, the physician may examine whether ligatures have not been applied to interrupt the pulsation, and he should also ascertain whether the arteries beat at the corresponding extremity. I am indebted to my late worthy preceptor, Dr. M'Clelland, of Albany, for a case illustrating this point. During the period of his attendance at the Royal Infirmary, in Edinburgh, a person applied for and obtained admission on the score of ill health, who had formerly been a patient there. The attending physician examined the pulse at the right wrist, but found none; he then tried the left, but with similar success. The trick was carried on for several days, at the end of which time, it was discovered that the patient was in sound health, but that whenever the pulse was to be examined, he pressed his finger on the artery under the arm-pit.

The *urine* may be altered in many and various ways. The best general rule in suspected cases, is to cause the patient to urinate in the presence of the physician, and to examine the vessel carefully both before and during the process. It is well known, that long retention or violent exercise will heighten the colour. Artificial substances have also been used to produce this effect: wine is one; but this may be detected by the smell. Other means are used to give the urine a watery appearance; this symptom, however, should be distrusted, unless other circumstances indicative of disease accompany it. Again, it may be feigned to be bloody. The fruit of the Indian fig (cactus opuntia) will colour it as red as blood;‡ and we have a powerful article in the materia medica, viz. cantharides, which will actually produce this state of the excretion, when taken internally. The experiment, however, is too hazardous to be often repeated, even for a temporary purpose. We must also remember, that blood may be easily procured and mixed with it. Hence the importance of the rule already laid down.§

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* Metzger, p. 214.

† I have seen a gentleman who, by the exertion of the muscles of the arm and thorax, could stop the action of the pulse at the wrist, but in so doing he required to call into action all the muscles of the arm, so that should a *malingener* attempt this, the cheat would easily be discovered by feeling the arm above the elbow. There was a preparation in the museum of Mr. Alan Burns, and which, I believe, is at present in the possession of my friend, Mr. G. S. Pattison, of Baltimore, U. S. where a slip of muscle passed across the humeral artery, and impeded its action. On inquiry being made, it was found that the subject had been a servant girl, and though strong and healthy in other respects, she could never, for any length of time, pump a well or switch a carpet.

In the army hospitals, where I have been accustomed to skulkers of all kinds, whenever I suspected a man of deceiving me, as to his pulse, I felt it at the temporal or carotid arteries, under the pretext of saving him the trouble of taking his arm from under the bed-clothes.—Editor.

‡ Zacchias, lib. iii. tit. 2. p. 290.

§ A boy at Bilson, (Staffordshire) A. D. 1617, accused a woman of having bewitched him; and succeeded so well in feigning convulsions, &c. that she was tried

Incontinence of urine. Two deserters were brought to the hospital at Martigues, on account of this disease. Foderè was the attending physician, and applied epispastics to the perinæum—a remedy which he in previous cases had found useful—but without success. They were discharged; but it was shortly discovered that they had feigned the disease. The consequence was, an epidemic incontinence of urine among their companions that remained. This awakened the suspicion of our author; and, above all, surprised that his remedy produced no effect in any case, he ordered that the penis of every patient should be tied, and on the knot a seal placed, which none but the gendarme who guarded them should have power to break, at such times as they wished to urinate. He charged the guard to visit them from time to time, to observe whether the penis was inflated, and also whether the urine was not discharged *guttatim.* He did this from having observed, that in real incontinence of urine, the penis becomes enlarged, so as to render it necessary to remove the ligature in a very short time. The expedient succeeded; it was removed only at the ordinary period, and in twenty-four hours the epidemic vanished.*

Dr. Hennen observes that this disease is almost always detected by giving a full dose of opium at night, without the knowledge of the individual, and introducing the catheter during sleep; or by taking him by surprise during the day, and introducing the same instrument, when it will be found that the urine has not drained off *guttatim* as it was secreted, but that the bladder possesses the power of retention.†

Maiming is sometimes feigned, under the hope of being admitted into hospitals, such as all high-spirited nations have erected for their wounded and decrepid soldiers and sailors. It may, however, be readily detected by examining the part complained of; as may also *deformity.* In both instances, the part and its articulation should be viewed naked, and compared with the opposite. The following extract from a rare book, called the "History of Knavery," will give an idea of the art that is frequently exercised by beggars. It is a notice published in 1702, and is in the following words:

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and condemned to die. Dr. Morton, the bishop of the diocese, suspected imposture, and caused him to be confined and watched. He grew apparently worse, and the urine which he openly voided was black. The good bishop almost despaired of saving the life of the female, in consequence of this dangerous situation of the boy. A vigilant spy, however, detected him in dipping a small piece of cotton in an ink bottle placed at the side of his bed. This he put inside of the prepuce, in order to give the urine its colour when he excreted in public. *Memoirs of Literature,* vol. iv. p. 357.

* Foderè, ii. p. 481.

† Hennen's Principles of Military Surgery, page 455. In a very interesting inaugural dissertation on feigned diseases, published by Dr. Blatchford in 1817, it is stated, that *suppression of urine* was a frequent disease among the female convicts at the New-York state prison. The author, who was the resident physician there for some time, relates two cases, in which the frequent use of the catheter obviated all the evil effects that a *voluntary* suppression might have produced, and also indicated when the complaints of pain and distress were groundless. (Pages 71 and 74). By a reference to old registers, he found that this was a common complaint immediately after the initiation of every "Resident Physician."

"That people may not be imposed upon by beggars, who pretend to be lame, dumb, &c. who really are not so, this is to give notice, that the president and governors for the poor of London, pitying the case of one Richard Alegill, a boy of eleven years of age, who pretended himself lame of both his legs, so that he used to go shoving along his breech, they ordered him to be taken into the workhouse, intending to make him a tailor: upon which he confessed that his brother, a boy of seventeen years of age, about four years ago, by the advice of other beggars, contracted his legs and turned them backwards, so that he never used them from that time to this, but followed the trade of begging; that he usually got five shillings a day, sometimes ten shillings; that he had been over all the counties, especially the west of England, where his brother carried him on a horse, and pretended he was born so. He hath also given an account that he knows of other beggars that pretend to be lame and dumb, and of some that tie their arms in their breeches, and wear a wooden stump in their sleeve. The said president and governors have caused his legs to be set straight; and he has now the use of them, and walks upright."*

Of *artificial dropsy and other tumours*, it may be observed that deception can only escape undetected until the individual be examined by a skilful physician. The following case, from the *Acta Naturæ Curiosorum*, will show how much we ought to distrust that affectation of modesty which will not permit a complete investigation. A young female at Strasburg, from the enlargement of her abdomen, had led the public to doubt the purity of her character. The distention continued so long as to dissipate the suspicion; and for thirty-nine years she continued to increase in bulk, and excited the commiseration and charity of all who saw her, in such a manner as to lead a highly comfortable life. Her case excited the attention of the physicians and surgeons; and they waited with some impatience until her death should develope the nature of this extraordinary disease. No tumour was found; but in her wardrobe was a sack or cushion weighing nineteen pounds, and so made as to fit the shape of the abdomen. This female would never allow a medical man to examine the seat of her pretended disease.†

Sauvages, in his Nosology, makes mention of a mendicant who gave to his child all the appearances of *hydrocephalus*, by opening the integuments of the head near the vertex, and then introducing air between them and the muscles. This infamous fraud was discovered by removing the patch which covered the hole, and prevented the air from passing out. A mountebank at Brest produced similar inflations, together with the appearance of the most hideous deformity, in a child, by means of the introduction of air, and the application of ligatures on various parts of the body;‡ and not long since, a female in France, by the same mode, caused an *emphysema* of the abdominal parietes, so as to resemble dropsy.[*] Tumours of this nature are readily produced, since the cellular texture is spread over the whole surface of the body, and air may be introduced through the smallest possible aperture. We must however recollect, that dropsy, hydrocephalus, and emphysema, are marked by stronger and more conclusive symptoms, than the mere existence of tumour. The sac in *hernia* has been ingeniously imitated with the bladder of an ox, and a *prolapsed rectum* and *uterus*, by means of a portion of the intestine of the same animal, in which a sponge filled with a mixture of blood and milk was placed. It was fixed into the vagina and rectum in such a manner, that one of its extremities was left hanging out.[†]

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* Mirror of Taste, a periodical publication. Philadelphia. Vol. ii. p. 441.

† Mahon, i. 362.

‡ Foderé, vol. ii. p. 485. He quotes the Bulletin of Medical Sciences of the Societé d'Emulation for this case.

Chemistry supplies us with the means of ascertaining deceit when the *excretion of calculi* is feigned. It teaches the characters which designate their animal origin. I should not have noticed this, were it not for a late case related in a highly valuable journal. A physician was consulted by the friends of a young lady of high respectability, concerning a very painful disease to which she was subjected. She was said to be frequently ill, and during the attack to void, with agonizing pain, concretions in her urine. A certain number of these being discharged, she felt relief. A parcel of these urinary concretions was handed to a physician, who instituted experiments on them, and found, what indeed was obvious on inspection, that they were nothing but common sand and pebble stones. Of these, it was asserted, she had excreted not less than several pint measures in the course of two or three years. No motives were assigned for this lady's extraordinary conduct.[‡] Dr. Thomson mentions a similar case that occurred in 1811, with a boy about ten years of age.[§]

Ulcers are frequently induced by the use of epispastics, or various acrid plants, and real ones are often prevented from healing by similar means. Besides noticing the nature of the discharge, whether it be pus or sanies, and also attending to the habit of the patient, it is sufficient to mention, that ulcers caused intentionally are easily distinguished from real ones, since their borders are less callous, their surfaces more superficial, and generally less painful; and by the use of lukewarm water, and covering them with lint, they are readily healed.[||]

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[*] Foderè, vol. ii. p. 485.

[†] Mahon, i. 357.

[‡] Edinburgh Med. & Surg. Journal, vol. vii. p. 488.

[§] Annals of Philosophy, vol. iv. p. 76. The grossest imposture of this kind, however, is that related by Dr. Livingston, of Aberdeen. A female gained admission into the Infirmary, on account of a suppression of urine, and passage of stones from the vagina. These, on examination, were found to resemble calcined bricks. On using the catheter, nothing particular could be discovered in the bladder, but stones were found sticking in the vagina; and after a careful search, a stone exactly similar was found in her pocket, and three or four in the bed. She then confessed the imposition, which appears to have deceived many.—Medical Commentaries, iv. 452.

Dr. Thomson, of Edinburgh, while a young man, as a chemical experiment, examined some of the sand which a woman alleged she had passed from her bladder, and found micatious particles in it, which put an end to the imposture. A poor woman in the Glasgow Infirmary, who was less of a geologist than her compeer, used pounded coals for a similar purpose.—Editor.

[||] During the war, ulcers were feigned to a prodigious extent in the army, for the

And the reason for this is, that they do not originate from or accompany a disease of the system. Frauds of this description are frequently attempted in hospitals, or to avoid the performance of labour of every kind. In 1810, a fellow enlisted in the marines at Portsmouth, (Eng.) and received his full bounty. In a few days, it was discovered that he had a very bad leg. On investigation, it was proved by his wife and others, that to avoid going on duty, he had made an incision in the flesh just upon the shin-bone, and put a copper halfpenny on the wound, which almost immediately caused a violent inflammation. He ultimately, however, paid most dearly for his speculation; as a mortification followed, and it was found necessary to amputate the limb.*

Nor is it confined to common ulcers alone. Even that dreadful disease *cancer* has been feigned. " I have seen," says Pierre Pigray, " a woman present herself to the late king of France, to be touched by him," (as the former kings of France were said to perform miracles in this way,) " who appeared to have a very large and ill-looking cancer of the breast. It seemed so extremely natural, that it might have deceived the spectators; but when I observed that she was young, of a good habit, well formed, and without any symptom of cachexia, I was led to suspect deceit. On touching the ulcer, I ascertained, though with some difficulty, that a part of a spleen had been glued on its smooth side to the nipple, which left on the outside a serous and reddish kind of matter, similar to that of cancer. When this was removed, the nipple remained white, healthy, and well formed."†

A false eruption of *petechiæ* or *pustules* may be detected by examining the patient perfectly naked.

It is easy to feign *hæmoptisis* by pretending to cough, and then spitting out the blood, which comes from pricking the gums, or it may be assumed by constantly holding some bol. armen. under the tongue, which tinges the saliva of a blood red colour. Periodical attacks of this disease are most commonly simulated. There are other persons who pretend to be afflicted with *hæmatemesis*, or vomiting of blood; and for this purpose, drink the blood of some animal, or use some coloured liquid, and then throw it up in the presence of spectators. Sauvages, in his Nosology, mentions of a young lady, who, being un-

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sake of procuring discharge, and getting a fresh bounty for re-enlisting. A scoundrel of the name of Noble, in the neighbourhood of Glasgow, who used to carry my bag a partridge shooting, often boasted to me that he had been discharged from six different regiments by the very means mentioned in the text. In the York Hospital, in the years 1812-13, we had many cases of this kind from the Peninsula, and were obliged to lock up the leg in a wooden box, prepared for the purpose, in order to secure ourselves against the patient tampering with the sore.

On a late visit to Sheerness, my friend Mr. Robertson, surgeon to the convict hulks, told me that the number of patients with ulcers on the leg was some months prior to this so alarming that he was afraid that the Secretary for the Home Department would take it up; but suspecting some fraud, he employed spies, when he found that all this disease was caused by a process termed in the flash language *fox-hunting*, that is, rubbing the sand used for scouring the deck with the thumb to the shin bone. He cured half-a-dozen of them convicted of this practice—had them flogged, and has never had an ulcer in his hospital since.—EDITOR.

* Edinburgh Annual Register for 1810, Part II. p. 185.

† Quoted from his Surgery. Mahon, i. 358. Foderé, ii. 486.

willing to remain in a convent, had some blood of an ox brought to her, which she drank, and then vomited in the presence of her physician. As no deceit was suspected, he stated that she was really ill, and she thus obtained her liberty.[*] A similar case is related of a female, who accused a person of having maltreated her. She went to bed, and brought up large quantities of blood without any effort. She could however sing, cry, and put herself in a passion, without the disease recurring, and it ceased when she found that the deceit would prove useless.[†] It will readily occur to the reader, that *menstruation* may be pretended, by staining the clothes and body with borrowed blood. All the discharges, however, which I have named, are marked with symptoms which cannot mislead, and need not to be enumerated.

Jaundice, when real, is known by the discolouration of the adnata, and of the urine. Clay-coloured stools are also another indication; yet it is stated, that individuals in France have imitated these to perfection, by taking daily a small quantity of muriatic acid. There are several substances, which, on being taken internally, produce a yellowness of the skin, but in such cases it is proper to recollect that real jaundice is frequently accompanied with vomiting, pain, and sleeplessness. The most unequivocal symptom, and therefore the most to be relied on, is the colour of the adnata. If yellow, jaundice is present, originating either from disease, or some artificial cause. *Cachexia* and *great weakness* are also often feigned, by using substances to make the face appear pale and livid. In these instances, inquire whether there is a loss of appetite, or of strength, or swelling of the legs. Examine also the pulse of the skin, whether the first be strong, and the latter hot.[‡]

Fever may be induced by the use of various stimulants, such as wine, brandy, cantharides, &c. It is assumed, when a disease is suddenly necessary, to avoid military requisitions, or the performance of work in prisons. Foderè states that he has observed a feverish state of the system thus induced by violent exercise, and then calling for the physician, has noticed the patient imitating the cold fit to admiration. Others again having taken emetics to produce similar effects.

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[*] Mahon, i. 361.

[†] Metzger, p. 462.

[‡] A very curious work was published at New-Haven in 1817, under the title of "*The Mysterious Stranger, or Memoirs of Henry More Smith.*" It purports to be written by the sheriff of King's County, New-Brunswick, and I have repeatedly understood, that there is no doubt of the authenticity of all the material facts. The hero of the story was a most accomplished villain. While in the prison at Kingston (N. B.) he began to spit blood, had a violent cough and fever, and gradually wasted away, so that those who visited him supposed that his death was rapidly approaching. This continued for a fortnight, and his weakness was so great that he had to be lifted up, in order to take medicine or nutriment. A turnkey unfortunately, however, left the door of the prison open for a few moments, in order to warm a brick for his cold extremities. On his return, *Smith had disappeared*. After many adventures and hair-breadth escapes, he is now a prisoner in the Newgate of Connecticut. There also he has feigned cachexia, hæmoptysis, and epilepsy, but with no success. He confessed that he pretended to raise blood by pounding a brick into powder, putting it in a small rag, and chewing it in his mouth. He contrived to vary his pulse by striking his elbows, and said he had *taken the flesh off his body in ten days, by sucking a copper cent in his mouth all night, and swallowing the saliva.*

Of all cases of feigned fever, it may be remarked that they are ephemeral. A day or two's examination developes the deceit, as a frequent repetition of the use of stimulants is too hazardous, and real disease might then be the consequence.*

It might appear, from the enumeration already made, that it would require but a moderate share of sagacity to detect feigned diseases. There are, however, some which are very intricate, and they belong to the class previously mentioned, whose origin is uncertain, and where the opinion to be formed depends greatly on the statement given by the patient himself.

Pain is the disease most frequently assumed; and in proportion to the facility of assuming it, must be the vigilance of those whose duty it is to detect the fraud. The inquiry should be made in all suspicious cases, where the disease is seated—what is probably its cause—the nature of the pain—its duration—its symptoms and effects, and what remedies have been already used?

The seat of pain is either the external or the internal parts. Patients will not so readily feign the former, since the deceit is liable to be soon detected; and, in addition to this, it is generally of that kind which is deemed a slight disease. Pain in the external parts is, moreover, often accompanied with heat, redness, change of colour, or tumour. Gout is sometimes pretended, and above all rheumatism, for which the soldier is always ready to assign sleeping on the ground as a cause. Both these diseases have diagnostic symptoms—redness, &c. in the one; and tumefaction, or diminution of size, with retraction, or loss of motion, in the other. But it is equally true, that there are species of severe pain in which the physician can find no external appearances to found an opinion; and of this description are scorbutic aud venereal pains. There are, however, other means of detecting these. Internal pain is accompanied with symptoms which it is impossible to assume, and their absence will of course lead to suspicion. Thus pain in the head is attended with loss of sleep, vertigo, fever, and sometimes with delirium—in the thorax, with cough and difficult respiration—so also in the bowels and kidneys. Each has its peculiar symptoms; which, if the disease be real, are not periodical or occasional in their attack, but incessant, and their severity is generally greater during the night. Inquiry ought also to be made concerning the cause of sickness, and a comparison drawn between it and the violence of the malady. With respect to the species of pain, we should examine whether it be sharp, heavy, or darting, and then compare this with the symptoms. It is, moreover, important to know the duration of the pain complained of; since it is very rare that it is prolonged for any length of time without exhibiting manifest and unequivocal signs. If violent pain is stated to be present, and the patient notwithstanding enjoys a good appetite, and sleeps well, we have reason to doubt its severity. Much may also be learnt from the remedies employed. Powerful ones are indicated, if the disease be real, and the patient will not object to their application. It may also be proper to mix a little opium in the food of the patient; and if sleep be thus readily induced, we may form an opinion as to the magnitude of the disease.

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* Dr. Hennen's remarks on this point are deserving of particular attention: "Neither the quickness of the pulse, nor the heat of the skin, are infallibly indicative of the presence of fever; and therefore it is, that the state of the tongue, stomach, and stools, and of the senses, should be most particularly attended to."—Principles of Military Surgery, p. 198.

Scrubbing the skin with a hard brush gives a flush difficult to distinguish from the colour caused by fever, and only to be detected by waiting patiently by the bedside until it subsides.—Editor.

Notwithstanding the above directions, instances have occurred of physicians mistaking real pain for feigned, and feigned for real. "I refused," says Foderè, "for fifteen years, a certificate of exemption to a young soldier, who complained of violent pain, sometimes in one limb, and sometimes in another, and occasionally in the thorax or pericranium, without any external sign to indicate its existence. He died at last in the hospital, from the effects of the malady, which he always insisted was a species of rheumatism. I examined the body after death, viewed all the former seats of disease, but discovered nothing either in the membranes, muscles, nerves, or viscera; and was hence led to believe that life was destroyed solely from the repetition and duration of these pains."* This case induced a determination in our author to be more lenient in future. Its success will be seen in the following instances: An artillerist, from the garrison of Fort de Bouc, was brought to the hospital at Martigues, with a violent pain in the left leg, and which was attributed to sleeping on the damp ground. During the space of eight months, a variety of antimonial preparations, together with mercurials and tonics, when indicated, were administered, along with local remedies, but without any relief. The leg, from the repeated use of epispastics and cauteries, became thin, and rather shorter than the other; while, from the low diet ordered, there was a general paleness and lankness of the system. Under these circumstances, Foderè could not refuse him a certificate as a real invalid. With the aid of a crutch, he dragged himself to Marseilles, where he obtained the promise of a discharge. He was ordered to return to the fort to await its arrival; but on his way thither, being too overjoyed, he was met by his commander, walking without his crutch. On being put in prison, he avowed the fraud.

Another case was that of a deserter, a Piedmontese, condemned to hard labour. He was conducted from prison to the workshops, marching on two crutches, as being paralytic in the lower part of the body; and from thence to the hospital, where he remained thirteen months. He supported during that time, with the greatest fortitude, the application of epispastics, moxa, and cupping; asked earnestly for the trial of new remedies, and excited the commiseration of all who saw him. At the end of the above period he was dismissed. In a short time he abandoned the use of his crutches, and never employed them, except when he expected to be observed.†

Feigned syncope and hysteria cannot resist the application of strong sternutatories to the nostrils. In the former, it is difficult to dissemble a small, feeble, and languishing pulse, an almost suppressed respiration, cold sweats, coldness of the extremities, and great paleness of the countenance. If ligatures are supposed to be used to prevent the pulse being felt, the body should be examined naked. So also if lotions have been applied to the face to give it a pale colour, let the face be washed. The causes assigned for producing the disease, and the rapidity with which the symptoms have presented themselves, should also be noticed.

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* Foderè, ii. 471.

† Ibid. ii. pp. 473, 474.

Cases are, however, mentioned where individuals possessed the power of suspending, or at least moderating, the action of the heart. And, on the contrary, some have been able to increase it at will.* All such require patient and repeated examinations.

Apoplexy will only be feigned by those who hope for immediate escape from some impending punishment. From the nature of the disease, it cannot be long dissembled. If it be necessary to ascertain the truth at the first moment of the attack, powerful remedies, such indeed as are indicated in the real disease, should be employed. Zacchias observes, that feigned apoplectics cannot resist the action of sternutatories. *Paralysis*, in many respects, requires the same treatment as rheumatism. A powerful shock from an electric jar may tend to develope the deceit.†

It is remarkable that a disease so much dreaded by the real sufferer as *epilepsy*, should be so often feigned; yet this is really the case, and the cause probably is, the affright and pity that may be inspired, or else the short exhibition of disease that is necessary, leaving the patient to act as he pleases during the interval. In all suspicious cases it is proper to notice whether the sick person falls to the ground suddenly, whether the face is livid, the pupil fixed, the lips pale, the mouth distorted and frothy, and the pulse altered. The physician ought also to observe whether sleep follows the paroxysm, and also if the patient complains of dullness of sensation, vertigo, and great weakness. All or most of these symptoms accompany real epilepsy. But the surest sign of this disease is a loss of feeling, so that sternutatories, and even the actual cautery, produce no effect during the paroxysm. This immediately gives us a mode of detecting artifice. An artillerist at Martigues had acquired, from frequent practice, such skill in feigning this disease, as almost to deceive Foderè, and this indeed would have been the case, had he been able also to resist the application of fire. This always recovered him, though he lay apparently without sense, his eyes starting from their orbits, and his mouth foaming. He afterwards confessed, that he never counterfeited a paroxysm, without feeling for several days a violent pain in the head.*

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* See Male, p. 267. Hennen, p. 466.

At the General Hospital at Chatham this was lately practised to a great extent; the mode employed was, to take 15 grains of helebore, which produced great excitement, which was maintained by taking 4 grains daily. The practice was introduced by a man who had been servant to a veterinary surgeon. One man took an overdose, and died in consequence.—EDITOR.

† Dr. Blatchford relates a case of feigned paralysis occurring in the New-York State Prison, which resisted all medicines, until he gave the patient a powerful electric shock. Upon receiving it, he jumped up, ran into the hall, and asked for his dismission from the hospital.

De Haen was consulted by a mother, whose daughter, after being cured of deafness, became epileptic. He directed her to be brought to the hospital at Vienna, where he attended. The fit, which at first did not occur more than once or twice a day, now recurred every hour. It resembled a real one, as the hands were violently clenched, and the eyes disordered; but he suspected deception, for the following reasons: she did not open her eyes during the paroxysm with a wink, but in the natural manner; her pulse was natural; when the curtains were drawn, the pupil of the eye was dilated, and when opened it was contracted, and this last occurred very violently when a candle was presented. Convinced that the disorder was pretended, he ordered her to be taken out of bed, and directed the attendants to keep her in an erect posture. If she fell, they were to chastise her severely. A cure was thus effected, and she confessed that both the deafness and epilepsy were feigned, to avoid going to service. In another case, a female, aged twenty, was confined in prison for a murder, who had on her the marks of three successive burnings, which she resisted without confessing the deceit. De Haen, and many others, saw her imitate a paroxysm of epilepsy with such horrible accuracy, that the feigned was supposed to be real, until, in the midst of it, being ordered to rise, she got up and walked away. In such an instance, our author recommends the remedy used at Paris. A beggar there, often fell into fits in the street. A bed of straw, through compassion, was prepared, on which he might be laid to prevent injury to himself. When next attacked, he was laid on it, and the four corners set on fire. He sprang up and fled.†

One fact should be kept in mind respecting this disease. The real epileptic is desirous of concealing his situation, and attaches to it a kind of false shame; while the feigned talks about the disease, and takes no precaution to avoid publicity.‡

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* Foderè, ii. p. 464.

† De Haen's Ratio Medendi, vol. 2, p. 56, &c. The following case should not be omitted. "Maturam virginem procorum penuria torquet, angitque. Forte casu audit a garrientibus inter sese matronis epilepsiam matrimonio nonnunquam curari. Ergo eam artificiose fingere discit, quo cogat parentes se viro jungere." (Ibid. p. 55.) The following is a case in point, with respect to the *aura epileptica.* Sauvages was called to visit a female, who imitated the fit to perfection. He was, however, suspicious concerning its reality, and therefore enquired whether, on the access of the disease, she felt pain extending from her arm to her shoulder, and from thence to the opposite thigh. She replied that she did, and this led to her detection. (Belloc, p. 243.) There are also some instructive cases of feigned epilepsy in Blatchford's Dissertation, already referred to.

A case is related of a country boy, who feigned epilepsy to avoid work. A surgeon was called, who suspected the deceit, and observed to one of the byestanders, that if it was a true fit, as he thought it was, the patient would turn round on his face and bite the grass; this he did, and so betrayed himself. On occasions of this kind, it is proper to examine the mouth for soap, which is easily done by pressing the cheeks against the grinder teeth. I once saw a pseudo epileptic in Edinburgh recovered by the simple expedient of calling a police-officer. —EDITOR.

‡ Dumas, of Montpelier, in his work on the *Physiognomy peculiar to some Chronic Diseases,* mentions, that in constitutional epileptics, the facial angle is

Convulsions, when feigned, do not present that stiffness of the muscles, or that resistance and rapidity of action, which appear in the real. The treatment must be similar to that of epilepsy. Twenty years ago, says Foderè, I proved, by the aid of fire and force applied to the antagonist muscles, that a woman who had imposed on a good curate in the Alps was an impostor. She was supposed to be possessed, fell down apparently without sense, and made frightful contortions. She could not, however, withstand the above tests, and rose up, to her great confusion and the astonishment of the spectators.[*] Similar proofs ought to be applied to those cases of *chorea* which are not unfrequently seen in our streets. It has been satisfactorily ascertained, that in some instances the disease is assumed to impose on public beneficence. *Ecstacies* and *possessions* are now with justice considered impossible, and those who pretend to them as impostors. There is, however, one form of disease nearly allied to those we are noticing, which deserves some attention. I allude to *catalepsy*. Its nature is but little understood; but we are informed that the patient is suddenly motionless, while the joints remain flexible, and that external objects make no impression. There seems no reason to doubt that real cases have existed;[†] but if there be any cause for suspicion, the remedies already indicated should be administered.[‡] The state of insensibility which some have feigned, might possibly, if real, be referred to this. Dr. Smith makes mention of a soldier named Drake, who assumed an appearance of total insensibility, and resisted for months every sort of treatment—even the

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always under 80°, and recedes from that to 70°. He found this to be the case in many instances, at the hospital in Toulouse. (London Med. and Phys. Journal, vol. 27. p. 38.) This is a remark which deserves further investigation.

[*] Foderè, ii. p. 468. The following is quoted from the *Journal des Savans* for January 1710. " Un mendiant de Flandre se faisait boucher le siège tous les matins fort exactement : et il avalait ensuite une demi-livre de beurre, avec une certaine dose de mercure. ce qui lui donnait des mouvemens si extraordinaires, que chacun le jugeait possedé. Le soir il se debouchait la partie, quil avait bouchée le matin, et il vidait par-la son esprit malin." (Ibid. p. 466.)

[†] Some remarkable cases of *catalepsy* are related in the Mem. of Literature, vol. 3. pages 100, 194, by Dr. Deidier, professor at Montpelier. See also Med. Comment. vol. 10, 242; and Amer. Med. and Phil. Reg. vol. 1. p. 47.

[‡] Dr. Gooch quotes the following case of feigned catalepsy from Mr. Abernethy's Hunterian Oration: " A patient in the hospital feigned to be afflicted with catalepsy; in which disorder it is said a person loses all consciousness and volition, yet remains in the very attitude in which they were suddenly seized with this temporary suspension of the intellectual faculties. Mr. John Hunter began to comment before the surrounding students on the strangeness of the latter circumstance; and as the man stood with his hand a little elevated and extended, he said, ' You see, gentlemen, that the hand is supported merely in consequence of the muscles persevering in that action to which volition had excited them prior to the cataleptic seizure. I wonder,' continued he, ' what additional weight they would support;' and so saying, he slipped the noose of a cord round the wrist, and hung to the other end a small weight, which produced no alteration in the position of the hand. Then, after a short time, with a pair of scissors, he imperceptibly snipped the cord. The weight fell to the ground, and the hand was as suddenly raised in the air, by the increased effort which volition had excited for the support of the increased weight. Thus was it manifested that the man possessed consciousness and volition, and the imposture stood revealed." Transactions of the College of Physicians of London, vol. 6, p. 272.

shower-bath and electricity; but, on a proposal being uttered in his hearing, to apply red-hot iron, his pulse rose, and an amendment shortly took place.* The case of Phineas Adams, which lately occurred in England, shows to what individuals will submit, in order to escape punishment. He was a soldier in the Somerset militia, aged eighteen years, and confined in gaol for desertion. From the 26th of April to the 8th of July 1811, he lay in a state of insensibility, resisting every remedy, such as thrusting snuff up the nostrils, electric shocks, powerful medicines, &c. When any of his limbs were raised, they fell with the leaden weight of total inanimation. His eyes were closed, and his countenance extremely pale; but his respiration continued free, and his pulse was of a healthy tone. The sustenance he received was eggs diluted with wine, and occasionally tea, which he sucked in through his teeth, as all attempts to open his mouth were fruitless. Pins were thrust under his finger-nails to excite sensation, but in vain. It was conjectured that the present illness might be owing to a fall; and a proposal was consequently made by the surgeon to perform the operation of scalping, in order to ascertain whether there was not a depression of the brain. The operation was described by him to the parents at the bed-side of their son, and it was performed—the incisions were made, the scalp drawn up, and the head examined. During all this time he manifested no audible sign of pain or sensibility, except when the instrument with which the head was scraped, was applied. He then, but only once, uttered a groan. As no beneficial result appeared, and as the case seemed hopeless, a discharge was obtained, and he was taken to the house of his father. The next day he was seen sitting at the door talking to his parent; and the day after, was observed at two miles from home, cutting spars, carrying reeds up a ladder, and assisting his father in thatching a rick.†

Nostalgia, or *maladie du pays*, is a disease common in military hospitals. This mental affection, if carried to excess, soon produces a physical one, and a mixed state is produced, in which all the marks of melancholy and hypochondriasis are visible. Young men are more subject to it than persons advanced in life, villagers more than citizens; and among nations, it is found to prevail most in the Swiss, the Savoyards, the inhabitants of the Pyrenees, the Flemings, &c. Besides the above considerations, and that alteration of countenance which it is impossible to feign, it may be added, that "pretenders generally express a great desire to revisit their native country, whilst those who are really diseased, are taciturn, express themselves obscurely on the subject of their malady, dare not make an avowal, and are little affected by the consolations which hope or promises offer to them."*

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* Smith, p. 471. See also Edin. Ann. Reg. vol. 9, part 2, p. 49. I presume this is the case which is mentioned by Dr. Hennen, (p 458) under the title of *Somnolency combined with mental hallucination*. The *approach*, not the *touch*, of a hot wire caused abundant marks of sensibility. The muscles of his face also were strongly and involuntarily affected when a shower-bath was applied. Dr. Smith recommends, that, in such cases, a *drop* of boiling water be suddenly poured on the naked back.

So well did this man acquit himself, that after he was removed to the York Hospital, many of the medical men were then, and still are of opinion, that the disease was real. I attended him at Hillsea along with Dr. Hennen and Dr. Knox, now of Edinburgh, who had the immediate charge of him, and from every thing I saw, and many experiments I made, I have not the slightest doubt that he was an impostor.—Editor.

† Edinburgh Annual Register, vol. 4, part 2, p. 159.

"It is curious to observe," says Foderè, "how many young men have, during the last twenty years, worn convex glasses, in order to acquire *myopia*, or *near-sightedness*; which, however, is not the certain consequence, but more commonly this practice leaves a weakened and defective sight, differing from it, and also from that which is the effect of old age. It is not from an inspection of the eye, nor from the account of the individual, that we can judge concerning the reality of the complaint; but it may be ascertained by presenting an opened book, and applying the leaf close to the nose, or by putting on glasses proper for near-sighted persons. If the individual cannot read the book distinctly when placed thus, or when the above glasses are used, we may feel confident that his disease is feigned."† This mode of examination should be strictly adhered to; since, as far as my observation has extended, no complaint is more frequently urged by those who wish to avoid military duty, than near-sightedness.‡

Opthalmia has often been artificially excited by the application of various stimulant remedies. It is, however, readily detected by the rapidity of its progress. *It arrives at its acmè within a few hours after the application of the acrid substance.* Some information may also be derived from noticing which eye is affected. A few years since, when an extensive system of deception prevailed in the British 28th regiment of foot, Dr. Vetch observed that the counterfeit inflammation was almost solely confined to the right eye.§ A left-handed man would probably inflict the injury, on the left eye.¶

That species of *blindness* which originates from amaurosis, is strongly characterized by the dilated and fixed pupil. There are, however, cases in which the pupil retains some contractile power, although we know the sight to be lost. In such an instance, epispastics, and setons, are proper; and if suspicion exists, the patient should be watched, to see whether he does not avoid obstacles put in his way. If this be carefully pursued, the deceit is often detected. The following case, however, occurred to Mahon. A young conscript was sent to the corps blockading Luxemburg. Having passed the night at the advanced-posts, he declared himself blind the next morning, and was sent to the hospital. The surgeons used the most powerful remedies, and were convinced that the disease was feigned, as the pupil contracted perfectly. He assured them, however, that he could not see, thanked them for their care of him, and asked for the application of new remedies. He was sent to the superior medical officers at Thionville. They also were convinced that it was a fraud; but having learnt the course that had been pursued, they determined on a last trial. He was put on the bank of a river, and ordered to walk forward. He did so, and fell in the water; from which, however, he was immediately taken by two boatmen stationed for that purpose. Convinced of his blindness, but unable to explain the dilatation and contraction of the pupil, the surgeon gave him a discharge; but warned him at the same time, that if his disease was feigned, it would prove of no avail, as it would sooner or later be ascertained that he was not blind. They offered him another, if he would confess the fraud. He hesitated at first; but being at length assured that they would keep their word, he took up a book and read.* "The proof in this case," says Foderè, "would have been complete, if, instead of a river, he had been put on the edge of a precipice, where he might see that nothing could prevent his destruction—*but what if he had been really blind?*"

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* Foderè, ii. 463, from the Bulletin des Sciences Med. de la Soc. d'Emulation. See a real case of Nostalgia by Dr. Rob. Hamilton, in Med. Comment. 11. 343.

The only two cases of Nostalgia I ever happened to meet with, do not bear out the general remark, that an inhabitant of a hill country, or a village, exclusively, is liable to this disease. The first was a recruit, a country lad, from the Fens of Lincolnshire, who died under my charge, on his passage to Canada, in the year 1813; and the other, a London pick-pocket, whom I saw this year (1824), in the Hulks at Sheerness.—Editor.

† Foderè, ii. 480.

‡ There was a young French Surgeon, in Edinburgh, in the year 1819, who was naturally short-sighted, but not sufficiently so to excuse him from military duty. He avoided the conscription, however, by habituating himself to read with a book close to his eyes.—Editor.

§ Edin. Med. and Surg. Jour. vol. 4. p. 158.

¶ Hennen, p. 465.

Pretended deafness, may be detected by making a noise at a moment least expected. This excites a sensation which it is difficult to conceal. Acute persons will also always find some mode of ascertaining the truth. A deserter, condemned to labour in the canal at Arles, said he was deaf, and passed for such with his comrades and guards. Being brought before the inspector to be examined, he appeared such as he stated, until Foderè spoke to him in a low tone of voice, saying, "You cannot persuade me that you are deaf; but if you will confess the truth, you shall have your discharge." To the astonishment of all, he answered, "Very well; I am not deaf."† Again, a conscript stated that he was deaf. The general who visited for the purpose of examination, let fall a piece of silver behind him. The deaf person turned his head round towards the place from which the noise proceeded, and by this means was detected.‡ "Who would believe," says Baron Percy, "that by exercise, some young men have so successfully affected deafness, that a fire of musquetry exploding suddenly at their side could not draw from them the least mark of fear or surprise? I knew one, however," he adds, "who betrayed himself at last before his judges, at the sound of a small piece of money designedly dropped on his foot, while it was whispered in his hearing, that he was surely going to be discharged."§

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* Mahon, 1, 360. † Foderè, 2, 475. ‡ Belloc, p. 252.

§ New York Med. Repository, vol. 17, p. 359.

In the York Hospital we had a soldier who feigned deafness so well, that firing a pistol at his ear produced no effect. We tried the experiment after he had been put to sleep by opium, and he started out of bed.—EDITOR.

Those who pretend to be *deaf and dumb*, have a still more arduous part to play, and need an art and perseverance of which few are capable. Such who are really in that unhappy situation, acquire a physiognomy and certain gestures which it is difficult to assume, and which it is impossible to prepare for every examination that may be made. In reviewing the histories of those pretending deafness and dumbness, it has been found, says Foderè, that women have been the most successful, and the sex fondest of talking are the most capable of feigning dumbness.

The Abbé De L'Epée was deceived by a pretended deaf and dumb person, who feigned to be the son of Count De Solar. Sicard, however, his successor, was more fortunate in detecting the villany of another, whose ingenuity resisted, for four years, an infinite number of investigations made on him in France, Germany, Switzerland, Spain, and Italy. This young man was named *Victor Foy*, and was from Luzarche, six leagues from Paris; but called himself *Victor Travanait*—travelling, as he said, in search of his father, but in reality to avoid military duty.

He was imprisoned in various countries, watched closely, and examined most rigidly, without being detected. So perfectly, indeed, had he accustomed himself to his part, that when he avowed the fraud, to use his own expression, he had unlearnt how to hear. In Switzerland, he was tempted by a young and beautiful woman, who offered him her hand, but without effect. In the prison at Rochelle, the turnkey was ordered to sleep with him, to watch, and never to quit him. He was repeatedly awakened in a violent manner, but his fright was expressed by a plaintive noise, and in his dreams guttural sounds alone were heard; and the hundred prisoners, who were all ordered to detect him if possible, could discover nothing from which they could imagine deceit. At last the officer charged with the police of the prison of Rochelle, became satisfied, after many examinations, that he was really deaf and dumb, and declared this in the public journals, so as to obtain his liberty. Victor unhappily at this period went beyond his capacity. He stated himself in writing to be an elève of the Abbé Sicard. This ingenious and worthy individual denied the fact without seeing him, and proved it from the writing. "I cannot tell," said he, in a letter to the counsellor of state, Real, "whether this person, confined at Rochelle, be really Victor Travanait, or not; but I can say positively that he was not born deaf and dumb." The reason which he assigned for this opinion, was, that he wrote from sound, while the deaf and dumb write only as they see. In his letters he appeared so ignorant as to divide some words, and annex prepositions to others, as if they were constituent parts. The following extract will serve as a specimen: "*Je jur de vandieux, ma mer et né en Nautriche, quhonduit* (pour *conduit*) *essepoise* (pour *espoir*); *torre* (pour *tort*); *ru S. Honoret, jai tas present* (pour *j'etais present*); *jean porte en core les marque* (pour *j'en porte encore les marques*)." It will be observed, that in this letter, Victor uses *q* instead of *c*; and from this Sicard inferred that he had heard, and knew that the sound of these gutturals was similar. He concluded by stating his conviction that Victor was not born deaf, and of course was not dumb.

The criminal was now brought to the institution for the deaf and dumb at Paris, and placed before the black board. He was ordered to write answers to questions put to him by Sicard, which he did in so able a manner, and eluded the most embarrassing questions so ingeniously, that nothing but his orthography could yet be adduced against him. Sicard had taught his pupils to articulate sounds, and he had done this by showing them the words as it were, by the apparent effects of touches on a musical instrument, and then pressing their arms more or less strongly. During this operation, he obtains at pleasure the hard or soft consonant, which serves as a sign for the required articulation. Victor, when put to this proof, instead of the syllable *pa*, pronounced only the vowel *a*, and never uttered the labial consonant, which all the deaf and dumb easily articulate. He was then put to the last test. When asked how he had been instructed, he answered by signs, and promised to explain by them such words as they might write on the black board, but could not do so. He was then placed among those who were really deaf and dumb, but understood nothing from them, nor could they comprehend him. Frightened at this detection, and still more so at the threat he had heard, that he would be confronted with the pastry-cook, to whom he had been an apprentice, he at last took up a book and read.[*]

It is an observation of the author from whom I have taken this case, that it was Victor's folly alone which detected him. Had he not asserted that he was a pupil of Sicard, he might have escaped. But he was ignorant that all were educated alike, and, of course, should express their ideas in a similar manner.[†]

From the enumeration now made, it will be seen that cases of feigned diseases occur most frequently in the military profession. And the surgeon, whose business it is to investigate such, should recollect that a double duty is required of him. He is to guard the interests of the public, so that they be not injured, and also those of the individual, so that he be not unjustly condemned.[‡]

Pretended pregnancy and delivery, and feigned insanity, will be noticed in subsequent chapters. And I shall conclude the consideration of the present topic, by remarking, that physicians are not unfrequently called upon to examine *impostors*, or those who feign diseases *which can have no existence.* The full consideration of these, however, belongs strictly to medical police; since they are seldom subjects of *legal* investigation.

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[*] Foderè, vol. 2, p. 478-9. When Mr. Clerc, the distinguished teacher of the deaf and dumb at Hartford, visited Albany, he informed me, that he was one of the pupils who assisted in detecting Victor.

[†] A case of pretended *deafness and dumbness* in this country, by a person named *James Stilwell*, was detected by Mr. Clerc in 1822. The imposture in this instance was, however, more clumsy than in the one in the text. See the National Gazette, Sept. 14, 1822.

Foderè says, that a good way to detect pretended deafness and dumbness is to say something deeply interesting to the patient in his presence, and mark the effect it produces on his countenance. Whether the *great unknown* has studied Foderè or not, it is impossible to determine; but he illustrates this admirably in Peveril of the Peak, where Fenella betrays herself on hearing that Julian is assassinated —EDITOR.

[‡] Dr. Smith observes, that, in military hospitals, he has seen wonderful cures effected by a medicine, which went under the mysterious name of *mistura diabolica*. It was a composition of salts, assafœtida, aloes, &c. and was given frequently, in small quantities, so as to keep the taste continually in the mouth. (Page 467.)

It has generally been the case, that the hope of exciting public curiosity, and, of course, commisseration and charity, has been the moving principle of impostors; and they have justly imagined, that the feigning of ailments contrary to the course of nature and the experience of mankind, would most readily answer the purpose.

Abstinence for a great length of time, is the most frequent, as well as the most successful of these deceptions; and the reason is obvious. It is practicable to a certain extent, and the most constant and minute attention is requisite to detect the falsehood. The most noted, because it is the most modern case, is that of Ann Moore, the fasting woman of Tutbury, (Eng.) According to her account, she commenced in March 1807, and continued fasting for six years. At the end of that period the imposture was discovered, in consequence of a watch placed over her; and it was ascertained that her daughter secretly gave her food and drink. The *cui bono* is readily explained, from the statement of Dr. Henderson, who observes that she made so much by the exhibition of her person, as to place 400*l.* in the stocks. She had, however, the power of abstaining from food for a considerable length of time. During the last watch, she received none for nine days and nine nights.[*]

I will add only one case to the preceding. Cicely De Rydgeway, in the 31st year of Edward III. was indicted, and condemned for the murder of her husband. It is stated that she fasted in prison forty days. A record, lodged in the tower of London, contains an account of this remarkable abstinence—attributes it to miraculous power, and adds, " Nos ea de causa, pietate moti ad laudem Dei, et gloriosæ Virginis Mariæ, matris suæ, unde dictum miraculum processit, ut creditur." It concludes with a full pardon of the criminal.[†]

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[*] Observations on this case may be found in the 5th and 9th vols. of the Edinburgh Medical and Surgical Journal, and also in the London Medical and Physical Journal, vols. 21, 24, 29, and 30.

[†] London Medical and Physical Journal, vol. 31, p. 50. I add the following references, for the use of those who may be desirous of examining the subject of abstinence. A female in Germany, who imposed on the public for two years, London Med. and Phys. Journal, vol. 7, p. 190.—*Mary Thomas.* London Med. and Phys. Jour. vols. 21 and 30.—Hildanus, Ramazzini, Block, Doebel, Fontenelle, and Dr. Willan, are quoted by Mr. Granger and Dr. Henderson, in their papers on Ann Moore's case in the Edinburgh M. and S. J. vols. 5 and 9.—Cases are also recorded in *Stalpart Van Der Wiel*, vol. 2, Observ. 15—*Haller's* Physiology, vol. 5, p. 168—*Schurigius'* Chylologia, chap. 4—*Edinburgh Medical Essays and Observations*. vol. 5, part 2, pages 1 and 6—*State Trials,* Emlyn's edition, vol. 5, p. 482. Trial of Richard Hatheway, for a cheat and impostor, at Surry Assizes, March 24, 1702. Among other things, he said that he had been bewitched by one Sarah Murdock; and, in consequence of this, he could not eat, but fasted ten weeks—*Harleian Miscellany*, vol. 4, p. 41. A discourse upon abstinence, occasioned by the twelve months' fasting of Martha Taylor, the famed Derbyshire damsel, by John Reynolds, surgeon—*Memoirs of Literature,* vol. 3, p. 112. Account of a Swedish damsel, who has lived six years without food, attested by the Bishop of Skara

CHAPTER II.

DISQUALIFYING DISEASES.

Disqualifications in civil cases—in criminal cases. Disqualifications for military service. Classes exempted by the law of the United States. Law of the state of New-York on exemption from military duty. Regulations in Great Britain concerning diseases which disqualify from military duty. Regulations for exemption in France. Tables of diseases which exempt from military duty in that country. Report on this subject to the legislature of the state of New-York by the surgeon-general. Laws on the giving of certificates.

This chapter, and the one preceding it, are intended principally for the use of the military physician and surgeon. But although the subject of disqualifying diseases falls peculiarly under their notice, yet there may be numerous instances in civil life, where the opinion of the medical man is required concerning them. He may be directed, for example, to ascertain whether an individual is fit to serve on a jury, whether he is able to attend as a witness, or whether he is competent to take on him certain offices or duties. Again, a physician may be ordered to investigate the condition of a criminal, and to report whether he is capable of undergoing hard labour, or of suffering other severe punishments that are inflicted by the justice of his country.

I shall accordingly consider this subject as follows:

1. As to the disqualifications in civil and criminal cases.
2. As to the disqualifications for military service.
3. As to the rules for certificates, and the law respecting them.

I. *Of disqualifying diseases in civil and criminal cases.*

In civil cases, the presence of acute diseases should undoubtedly exempt from the performance of most of the offices or duties to which an individual can be called. The imminent danger which may follow from muscular exertion, together with the weakened state of the mental faculties, which generally accompanies these ailments, renders a demand for such performance cruel and oppressive. And, accordingly, in all countries, where the law governs, the proof of this is deemed a sufficient exemption. But there may be diseases on which a doubt exists, whether the required exertion would prove injurious; as, for example, rheumatism, asthma, and particularly epilepsy. Concerning such, it would be idle to give any specific rules, farther than

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(West Gothland)—*Republic of Letters,* vol. 2, p. 439. History of a singular and extraordinary distemper in a woman, by Dr. Michelletti—*Philosophical Transactions,* vol. 14, p. 577; vol. 28, p. 265; vol. 31, p. 28; vol. 42, p. 240; vol. 67, p. 1—*Medical Commentaries,* vol. 14, p. 360. *Quarterly Journal of Foreign Medicine and Surgery,* vol. 5, p. 130.

to observe, that it behoves the examining physician to enquire into the nature of the particular case, from his knowledge of it, to be guided in his testimony. Should there be a patient liable to convulsive affections, and who is only preserved from frequent attacks by being kept calm and sequestered, he certainly would not be a proper person to serve on a jury, or to be kept for a length of time as a witness before a crowded court. The same remark applies to those who are labouring under infirm health, or a predisposition to consumption, who have symptoms of aneurism, of stone in the bladder, &c. or who suffer from periodical or continued attacks of pain in one or the other organs. The humane, and therefore the just rule in all these cases, is to exempt the subjects of such maladies from all duties that are not indispensible.

The distinction, however, should be kept in view, that many who are unable to travel without great danger, may still be examined at their own houses, and that thus the ends of justice can, in a great degree, be answered.

As to criminal cases, it is equally unnecessary for me to enlarge, since the well-known humanity of our country renders it superfluous. I may, however, remark, that while acute diseases deserve commiseration and attention, as much as in the preceding instances, there are also some maladies which should prevent or delay the execution of the higher punishments. We can readily imagine a state of body in the criminal, that would make the application of irons to his limbs, or the condemnation to hard labour, a sentence more dreadful than death itself.

In all cases, whether of a civil or criminal nature, every thing must depend on the skill of the physician, and the correctness of his testimony concerning the diseased person. As it is impossible to suggest specific rules, applicable to every instance that may occur, so it will be his duty to study the peculiar symptoms and indications with great attention, and, while he leans to the side of mercy, avoid being deceived by feigned representations of imaginary maladies.*

II. *Of disqualifications for military service.*

In every state, however despotic, there are certain classes of individuals exempted from military duty. This is, in fact, deemed indispensable, even with those who consider the male population merely as the material for armies. There must remain some to renew the waste of war—some to support the females and children of the nation, and others to protect them from injury.

The Jewish law-giver, in his statutes, mentions several classes who were exempted from this duty, and, in particular, all married persons during the first year of their marriage.† And similar provisions are to be traced in the laws or customs of all countries.

In the United States, by a law of congress, all persons under eighteen years of age and above forty-five, are exempted. The importance of this regulation in time of war is incalculable, since it prevents the destruction of such whose strength is not yet matured, as well as those who are already feeling the advances of age. It is also understood, that there are many diseases which disqualify and exempt from military duty. The law of the state of New York directs, that the age and ability to bear arms of every enrolled person shall be determined by the commandant of the company, with the right of appeal to the commanding-officer of the regiment; and it adds, what indeed must now appear superfluous, "*that the certificate of a surgeon or surgeon's mate shall not be conclusive evidence of the inability of any person to bear arms.*"[*] The phraseology of this section would lead one to suppose, that great doubt was entertained of the integrity or capacity of the medical staff on the subject of certificates. It appears, however, that their opinion is to be taken, and is then to be judged of conclusively by so enlightened and learned a body as the respective captains of companies. The enquiry follows, *what diseases should incapacitate from military service?* I shall endeavour to answer this question for the benefit of the surgeons, but not with the faintest hope of informing the other branch of the military order.

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* See on this subject, Foderè, vol. 2, p. 431, &c.

† Deuteronomy, 24-5. See Michaelis, vol. 3, p. 34, for an enumeration of the classes that were exempted.

With a solitary exception, which I shall hereafter mention, we have no written rules to guide the American military surgeon. The warlike governments of Europe have, however, found it necessary to prepare regulations, many of which might be introduced with utility into our own system. And indeed it is deserving of consideration, whether a list of the diseases that partially or totally exempt, should not be prepared for the guidance of the medical staff.

The instructions given by authority to the English army surgeons, are thus quoted by Dr. Smith: "It is the duty of the regimental surgeon to inspect and examine recruits before final approval.[†] He is to be careful not to certify to any man's fitness for service, whose state of health he has not minutely investigated. The recruit, at his examination, is to be stript of all his clothes, in order that it may be ascertained that he has no mark of punishment, no rupture, or scrophulous affection of the glands; that he has the perfect use of his eyes and ears, the free motion of every joint and limb; that he has no sore leg, nor mark of an old ulcer, with adhesion of the skin to the bone; no varicose veins, nor diseased enlargement of bones or joints; he must neither be consumptive, nor, so far as can be ascertained, subject to fits. With any of those defects, the man is to be reported unfit for service."*

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[*] See the "Act to organize the Militia," passed April 23, 1823.

[†] Final approval refers to the time when the recruit joins his corps. He may be enlisted in some distant part of the country, and approved; but, on reaching the place where he is to be formed into a soldier, he must be examined anew by the commanding-officer and surgeon.

In our army the commandant never interferes, except when, from general debility or obvious bodily infirmity, a recruit is not equal to the duties of a military life. The recruit is first examined by the surgeon of the district where he is enlisted, then by the Regimental Surgeon on joining; and should any difference of opinion take place, the case is referred, and if near London to the Medical Board, or if at a distance, to a Board called together specially for that purpose.—EDITOR.

The military system of France being more perfect than that of any other nation, it might be expected that rules on this subject would be formed; and accordingly we find that such were promulgated at an early period after the revolution. A number of the inspector-generals, (viz. *Coste*, *Biron*, *Heurteloup*, *Villars*, *Parmentier*, *Bruloy*, *Imbert*, and *Kanens*,) were constituted a counsel of health of the armies; and they prepared certain tables of diseases, which partially or totally exempted from military duty. This was done during the reign of the directory, (year 7 of the republic;) but they were incorporated into the *code de la conscription* by Bonaparte, and doubtless are still in force.

Among the preliminaries necessary to obtain an exemption, are the following: Every conscript who pleads bad health, or bodily inability, must appeal in the first instance to his municipal administration; and he is not entitled to present himself for this purpose, unless he bring a certificate from a health officer, that he is really affected with a disease which appears to him to authorise an application. He is then to be examined by a health officer in presence of the administration, if he be capable of attending, or in presence of a delegate from it, if he be totally unable to attend in person. Before any dispensation be granted, the commissioner of the executive directory must be heard; and he may, if any doubts be entertained, require a counter-examination. When the municipal administration consider any appeal to be without foundation, the conscript is obliged to join the army without delay. When they consider themselves incompetent to decide upon the appeal, the conscript is allowed to present himself immediately before the central administration, for their decision. And the municipal administration can only grant *definitive* dispensations in cases of palpable and notorious infirmities. They may allow *provisional* ones, not exceeding three months, when acute diseases or accidents prevent the conscript from presenting himself.

All the decisions of the municipal, must be sent to the central administration, for their approbation or rejection; and if they refuse to ratify them, the conscript must again be examined. Lastly, when they confirm a dispensation, it is sent to the minister of war, who forwards an exemption to the conscript, or annuls the dispensation.

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* *Instructions for the regulation of army hospitals*, quoted by Dr. Smith, p. 435—6. This author recommends that the following should be added to the above list—insanity, imbecility, dumbness, and deformity of limbs.

These causes of incapacity are, and always have been understood. During the heat of the war, when levies of recruits to the amount of 100 or 150 often joined a regimental depôt at a time, a half-witted fellow might sometimes be slipped through, particularly when the officers wished to shew a strong paper muster, in order to escape disagreeable duty at home, and be sent on a dashing service abroad, where there were some hopes of promotion from that great desideratum of an officer, "a bloody war or a sickly season;" but these gentry were got quit of as speedily as possible, whenever they had served the purpose for which they were enlisted. At present, we are a great deal too nice as to our recruits, in my opinion, as symmetry of form is now an indispensible requisite for a soldier. Large broad or splay feet for instance, are, at present, inadmissible; a regulation which amounts almost to a virtual exclusion of the inhabitants of the Highlands of Scotland from His Majesty's Service, a service of which, according to themselves and Col. David Stewart, of Garth, they are so exclusively the ornaments.—EDITOR.

A distinction is also made, as to the diseases to be judged of by the respective administrations. The municipal can only take cognizance of palpable and notorious infirmities; while every application for a dispensation, definitive or provisional, for diseases not obvious, or which do not prevent the applicant from attending at the capital of the department in person, must be judged by the central administration.*

The officers of health, in giving their opinion, are directed to regulate themselves by the following tables:

TABLE I. *Evident infirmities, implying absolute incapability of military service, and which are left to the decision of the municipal administrations of the canton.*

1. Total privation of sight. 2. The total loss of the nose. 3. Dumbness; permanent loss of voice; complete deafness. If there be any doubt of the existence of these infirmities, or if they do not exist in a great degree, the decision is to be reserved for the central administration. 4. Voluminous and incurable goitres, habitually impeding respiration. 5. Scrophulous ulcers. 6. Confirmed phthisis pulmonalis, *i. e.* in the 2d or 3d degrees. Care should be taken to report the symptoms characterizing this state; and as they are but too evident, they ought to procure an absolute dispensation. But for commencing phthisis, asthma, and hæmoptisis, the municipal administration ought to grant only a provisional dispensation, if the person be incapable of presenting himself before the central administration; the decision in these different cases being reserved to the latter. 7. The loss of the penis, or of both testicles. 8. The total loss of an arm, leg, foot, or hand. The incurable loss of motion of these parts. 9. An aneurism of the principal arteries. 10. The curvature of the long bones; rickets and nodosities sufficient evidently to impede the motion of the limbs. Other diseases of the bones, although great and palpable, are sometimes liable to doubt, and therefore are reserved for the judgment of the central administration. 11. Lameness (claudication) well marked, whatever be the cause; this must be precisely stated. The same is the case with considerable and permanent retraction of the flexor or extensor muscles of a limb, or paralysis of these, or a state of relaxation impeding the free exercise of the muscular movements. 12. Atrophy of a limb, or decided marasmus, characterised by marks of hectic and wasting, which should be stated in the report.

TABLE II. *Infirmities or diseases which occasion absolute or relative incapacity for military service, and which are reserved for the examination and opinion of the central administrations of the department.*

1. Great injuries of the skull, arising from considerable wounds, or depression, exfoliation, or extraction of the bones. These some-

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* Edin. Med. and Surg. Journal, vol. 6, p. 138, 139.

times occasion all, but commonly several of the following symptoms: affection of the intellectual faculties, giddiness, swimming in the head, drowsiness, nervous or spasmodic symptoms, frequent pains of the head. 2. The loss of the right eye, or of its use. This defect disqualifies a man for serving in the line, but does not prevent him from being useful to the army in other services, or in the marine. 3. Fistula lacrymalis, chronic opthalmia, or frequent rheums in the eyes, as well as habitual diseases of the eye-lids or lacrymal passages, of such a nature as obviously to injure the powers of sight. 4. Weakness of sight, permanent defects of vision, which prevent objects from being distinguished at the distance necessary for the service of the army, short-sightedness, night-blindness, confusion of vision. In a note, it is observed, that these affections of the sight are often difficult of decision; and it is recommended to the surgeon to ascertain the effect of glasses on the persons complaining of near-sightedness.* Nyctalopia, it adds, is rare in youth, and often only temporary; while amblyopia, or confusion of vision, may be known with some certainty, when we perceive that the pupils have changed their diameter, or when they have lost somewhat of their mobility or regularity. This, however, is not always present, and in doubtful cases, it is directed, that the testimony of ten individuals, not relatives of the appellants, should be brought, affirming the existence of these defects. 5. Deformity of the nose, capable of impeding respiration to a considerable degree, ozæna, and every obstinate ulcer of the nasal passages, or palate, caries of the bones, and incurable polypi. 6. Stinking breath from an incurable cause, as well as fœtid discharges from the ears, and habitual transpiration of the same character, when incurable. Soldiers who emit these fœtid exhalations, are rejected by the corps, and repulsed by their comrades. 7. Loss of the incisive or canine teeth of the upper or under jaw; fistulas of the maxillary sinuses; incurable deformity of either jaw by loss of substance, necrosis, or other cause, hindering the biting of the cartridge, or impeding mastication, and injuring the speech. A person without canine or incisive teeth, cannot be a soldier of the line, but may be employed in other services. 8. Salivary fistulas, and the involuntary flux of saliva, when incurable. 9. Difficulty of deglution, arising from paralysis, or some other permanent injury, or incurable lesion of the organs employed in that function. 10. Permanent and well-established diseases of the organs of hearing, voice or speech, considerable in degree, and capable of impeding their use considerably. As these diseases are very doubtful, and may frequently be simulated, it is advised, that testimony proving their existence should be obtained, and the examination also should be repeated for several months at stated periods. An absolute or definite exemption need not to be given, as they yield to time and skill. 11. Ulcers and tumours of a decidedly scrophulous nature. The symptoms, if any be present, of a scrophulous cachexy, should be stated. 12. Deformity of the chest, or crookedness of the spine, sufficient to impede respiration, and to prevent the carrying of arms and military accoutrements. 13. Phthisis in the first degree, confirmed asthma, and habitual, frequent, and periodical spitting of blood. The state of patients attacked with these diseases is often evidently bad, and accompanied by circumstances which leave no doubt; they then admit of an absolute dispensation. Sometimes they are less decided, when only a provisional judgment is to be given. 14. Irreducible hernias, and those which cannot be reduced without danger. 15. Stone in the bladder, gravel, habitual incontinence or frequent retention of urine, as well as severe diseases, or lesions of the urinary passages, fistulas of these parts, whether incurable, or requiring constant medical assistance. In a note, it is remarked, that retention of urine produces well-known symptoms, which will guide to a knowledge of the true state of the case. Incontinence may be simulated with less danger of detection, and apparently in order to avoid the advantage that might be taken of this, it is directed, that if the young man has, in other respects, a healthy and vigorous look, *he may be sent to the army without any inconvenience.* 16. The permanent retraction of a testicle, its strangulation in the ring, sarcocele, hydrocele, variocele, all severe affections of the scrotum, testicles, or spermatic cords, known to be incurable. 17. Ulcerated hæmorrhoids, incurable fistula in ano, periodical and incurable hæmorrhoidal flux, habitual and chronic flux of blood from the intestines, habitual incontinence of fæces, habitual prolapsus ani. These ought to be stated by able health officers, who have for a length of time treated and observed the patient; and a provisional dispensation is only to be given until their incurability is established. 18. The total loss of a thumb or great toe, of the forefinger of the right hand, or two other fingers of one hand, or two toes of one foot; the mutilation of the last joints of one or several toes or fingers; the irremediable loss of motion of these parts. These, although they interfere in different degrees, with several parts of the infantry service, do not unfit for other duties, such as miners, sappers, pioneers, or even for cavalry duty, if the mutilation of the toes or right hand be not considerable. If, therefore, the petitioner, on account of any other mutilation than the loss of the thumb, is in other respects strong and of a robust constitution, he ought to be sent to the army. 19. Incurable deformities of the feet, hands, limbs, or other parts which impede marching, or handling of the arms, or carrying the accoutrements, or the free motion of any weapon. These may produce only a relative invalidity, and hence the physical effects arising from them should be stated. 20. Large and numerous varices. 21. Cancers and ulcers, which are inveterate, of a bad character, incurable, or whose cure it would be imprudent to attempt. The state of body accompanying them should be mentioned. 22. Large and old cicatrices badly consolidated, especially if they have adhesions, and are accompanied by the loss of substance, covered with crusts, or attended with varices. 23. Severe diseases of the bones, such as diastasis or separation, anchylosis, caries or necrosis, spina ventosa, osseous tumours, and those of the periosteum, when considerable, or situated so as to impede motion, and which have been treated without success. 24. Diseases of the skin, when they are capable of communication, when they are old, hereditary or obstinate, as tinea, acute, moist, and extensive herpes, obstinate and complicated itch, elephantiasis, lepra. In all these cases, a definitive dispensation cannot be granted, until after methodical treatment by very intelligent officers of health has been continued in vain, or unless the constitution of the patient be obviously injured. 25. Decided cachexy, of a scorbutic, glandular, or other nature, known to be incurable, and characterised by evident symptoms of long standing. Dropsies known to be incurable. 26. Debility and extreme extenuation, joined to a diminutive stature, or to a very tall one, out of the ordinary proportions. This case requires great judgment in deciding on it; and it is advised to adjourn the decision from quarter to quarter. "When a conscript has grown very rapidly, when he is tall, lean, and slender made, when he has a long neck, arms and legs, and when his breathing is difficult from the least exercise; such an individual is out of the question, until nature has added in strength, what it has hitherto confined to stature." 27. Gout, sciatica, inveterate arthritic and rheumatic pains, impeding the motions of the limbs and trunk. If these are present in an acute form, the conscript has a right to a provisional dispensation. But if they be chronic, particular attention should be paid to the condition of the parts. Gout seldom arrives to a high degree of obstinacy, without leaving nodosities and sensible contractions, while protracted rheumatism alters the form of the muscles and colour of the skin, and causes a wasting of the part affected. The surgeon is warned, in cases where no sensible appearances prove the existence of rheumatism, not to mistake a feigned for a real disease; and the following acute remark is added: "As it is but just, that in some other equivocal cases, such as those respecting the diseases of the breast, humanity should incline to the conscript's side; so with respect to pains and rheumatism, which are not proven, it is equally proper to prefer severity to indulgence, *as military exercise, far from aggravating the predisposition, if it exist, will only contribute to remove it.* 28. Epilepsy, convulsions, general or partial convulsive motions, habitual trembling of the whole body, or of a limb, general or partial palsy, madness, and imbecility. The surgeon in this class of cases, is to be particularly careful not to be deceived by a simulated disease.*

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* See chap. 1, p. 22.

The only American publication on this subject with which I am acquainted, is a report made by Dr. Samuel L. Mitchill, surgeon-general of the militia of New-York, to his excellency Governor Clinton, and communicated to the legislature of this state at their session in 1819.† The bodily disabilities for military service are arrayed by

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* These regulations are published in French in Belloc, p. 344 to 362; and a translation of them, which I have used, is contained in the Edin. Med. and Surg. Journal, vol. 6, p. 138 to 147.

† Assembly Journals for 1819, p. 25.

Dr. Mitchill into classes, with reference to various parts of the body; but the diseases enumerated by him are all included in the tables just quoted, and it is therefore not necessary to repeat them.*

I apprehend that there could be no difficulty in preparing a list of disqualifying diseases, adapted to our circumstances, from the extracts now given; and as the French system is drawn with great severity, some latitude might be allowed in adding additional diseases. The duty required from our militia in time of peace is not arduous; but it would be proper, I conceive, to apply the same rules to it in peaceful as in warlike times. And the object would be effected by preparing tables of temporary and permanent disqualifications, enjoining surgeons to grant certificates according to their specifications, and obliging them to report to a superior authority all cases not coming within their purview.

III.—*Of the rules for certificates, and the laws respecting them.*

There are laws in all countries for punishing those who absent themselves from civil duties under false excuses, and it is not necessary to mention them in this place.

As to certificates for exemption from military duty, I will only observe, that the surgeon should feel himself bound by every principle of honour and of justice, not to injure the public, by granting them to individuals capable of bearing arms. His examinations should be precise, and frequently repeated. He should learn the history of the disease from the person complaining, and compare it at his leisure with his own knowledge, and that of others. Nothing can be more disgraceful, than that a surgeon—one who is supposed to know the nature and symptoms of disease—should be deceived by an individual who feigns his maladies.

If it would not appear presumptuous, I would suggest, that probably the best arrangement on this subject for our own country, would be, to prepare a list of disqualifying diseases, as already stated; to direct by authority that these should guide the surgeon in his certificates; and then give the colonel, or commanding officer of the regiment, a supervision over the certificates. This is the mode adopted in England; and it is certainly preferable to that which throws nearly all the power into the hands of the captains of companies.†

By the French law, "all officers of health, and others convicted of having given a false certificate of infirmities or inabilities, or of having received presents or gratifications, shall be punished by not less than one or more than two years' imprisonment, or by a fine of not less than 300, nor more than 1000, francs."*

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* As another testimony of the value of the directions quoted from the "Code de la Conscription," I may adduce the opinion of Dr. Hennen: "I would," says he, "strongly recommend a perusal of it to all medical officers." And in his observations on the examinations of recruits, he notices all its leading particulars. See page 450, &c.

† I copy the following from an English paper, as one of the grounds of exemption in that country from performing duty in the militia. "All persons laboring under such permanent infirmity as may incapacitate them from military service, *to be certified in all cases, where practicable, by the surgeon of the distric, appointed by the lieutenancy.*" Scotsman, Oct. 5, 1822.

The law in this state forbids "any surgeon or surgeon's mate to take any fee or reward for giving a certificate."

CHAPTER III.

IMPOTENCE AND STERILITY.

Laws of various countries concerning impotence as a cause of divorce—Roman law—canon law—ancient French law—Napoleon code—English law. Causes of impotence in the male—absolute—curable—accidental or temporary causes. English and French law on accidental causes as affecting paternity. Diseases that may produce temporary impotence. Causes of impotence in the female—incurable and curable. Sterility—incurable and curable—causes. American law on impotence as a cause of divorce.

A KNOWLEDGE of this subject may become necessary in various ways, before judicial tribunals. An individual accused of committing rape has been known to plead that he was physically incapacitated, while the legitimacy of children has been contested on a similar plea. These examples are sufficient to shew the necessity of a brief notice of the physical signs of impotence, even were they not connected with the subject of divorce.

The laws of Moses, and afterwards the Roman law, permitted divorce at the pleasure of either party. The Christian law, however, declares marriage to be indissoluble; and Justinian, legislating on this principle, was the first monarch who prescribed the mode of obtaining divorce by law, and at the same time promulgated statutes as to impotence.† He ordained that if the imbecility continued for two years after marriage (which period was afterwards enlarged to three years,) the female should be entitled to a divorce.‡

We are informed that it was not until the twelfth century that this jurisprudence came into general use. The canon law, under which these cases were judged, always desired (at least in practice) that the defect should be shewn to have existed before marriage; and that, after its celebration, a certain period of time should have elapsed before a complaint was entertained, in order to ascertain whether the impotence was absolute, or only accidental. These dispositions of the canon law were adopted into the civil law of ancient France; and many arrêts of parliaments have admitted the plea of impotence, and dissolved marriages of eight, twelve, and even fourteen years standing. Accidental impotence, however, in the sense I shall hereafter define it, was never deemed a just cause of divorce by any of these tribunals. In 1759, the parliament of France refused the application of a female, whose husband had been declared impotent during his first marriage, on the principle, that at his second nuptials, several years after, the physicians declared that he appeared to be cured of his disease.*

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* Edin. Med. and Surg. Journal, v. 6. p. 139.

† Gibbon's Rome, vol. 8, chap. 41, p. 64.

‡ Code Justinian, lib. 5, tit. 17.

The Napoleon code does not expressly declare that absolute and incurable impotence is a dissolving cause of marriage; but the course of legal proceedings under it leads to this conclusion. The court of appeals at Treves in 1808, in the case of a female, directed that she should be visited by medical men, who were to report to that tribunal, whether the supposed injury occurred before or after marriage, and whether it was remediable.†

The law of England, as laid down by Blackstone and his editor, is as follows: a total divorce is given whenever it is proved that corporeal imbecility existed before the marriage. In this case, the connexion is declared to have been null and void *ab initio*. Imbecility may, however, arise after marriage, but it will not vacate it, because there was no fraud in the original contract, and one of the ends of marriage, the procreation of children, may have been answered.‡

There is, however, one case on record, which was decided on very different principles. I refer to that of the earl of Essex, in the reign of James the First. His countess transferred her affections to the royal favourite, viscount Rochester (afterwards earl of Somerset,) and being desirous of a divorce, complained that her husband was impotent. She deposed, that for the space of three years they had lain together, and during that time he had repeatedly attempted to have connexion with her, without success. She also stated that she was still a virgin, and several peeresses and matrons, who were directed to examine her, corroborated this statement, although it is mentioned that she substituted a young female of her own age and stature in her place during the examination. She was also pronounced to be well fitted for having children. The earl, in his answer, admitted his inability to know her, while he denies his impotence as to other females, and insinuates his belief of her incompetency for copulation. After the examination of numerous witnesses, objections were raised by Abbot, the archbishop of Canterbury, and one of the king's delegates on this trial, on the propriety of dissolving the marriage on such grounds; to which the king vouchsafed an angry reply. It was finally decided by the vote of seven delegates (five being absent, and not consenting,) that the marriage should be dissolved, and the parties allowed to contract new marriage ties.*

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* Foderè, vol. 1, p. 361. It will astonish those who have not attended to this subject, to learn that there was a period in French jurisprudence when actual congress was a judicial proof in cases of impotence. At first it was conducted in a private manner, but afterwards became shamelessly public. This prevailed from the 13th century until the year 1677, when it was solemnly proscribed. Mahon, vol. 1, p. 70.

† Foderè, vol. 1, p. 362, 363.

‡ Blackstone's Commentaries, with notes by Christian, vol. 1, p. 440.

The causes of impotence have been variously divided by different writers; but I conceive that I shall be best enabled to give a comprehensive view of them by adopting the arrangement of Foderè, into *absolute, curable, and accidental or temporary.*

We shall first notice those in the male.

The absolute causes of impotence, or those for which there is no known relief, principally originate in some mal-conformation or defect in the genital organs, and these may be either natural or artificial. To this class, we refer the following—an absolute want of the penis. Cases are not unfrequently met with in medical works, where it is stated that the ureters were found terminating in the perinæum, or above the os pubis. Foderè observes, that he cured a young soldier of incontinence of urine, in whom there was a fleshy excrescence, like a button, in the place of the penis, and at which the ureters terminated. The testicles were well formed. Many cases are also on record of the penis being impervious.† An amputation of that organ, or indeed of the glans penis alone—its curvature—a schirrous state of it, or a paralytic one, induced by injury to the nerves or muscles of the parts; an unnatural perforation of the penis, or in other words, the extremity of the canal of the urethra terminating at some place other than its natural situation. This is deemed by some an absolute cause, while others assert, that though coition may be possible, yet it will prevent pregnancy. Belloc, however, relates that he knew a person at Agen, in whom the orifice of the ureters terminated at the bottom of the frænum, and who had four children resembling their parent, and what is still more remarkable, two of them had the same mal-conformation.‡ Much will depend, in such cases, on the distance to which the orifice is thrown back. If it be very far, we have reason to believe that the marriage will be unfruitful.

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* Hargrave's State Trials, vol. 1, p. 315. See also No. 1, in the Appendix to vol. 8, being a narrative of the proceedings on the trial, drawn up by the archbishop of Canterbury. In the speech which he intended to have delivered on giving his opinion, he relates the case of one Bury, tried in 1561. His wife cited him before the ecclesiastical court on the ground of impotence, and the physicians deposed that he had but one testicle, and that no larger than a bean. The want of access was also proved. A sentence of divorce accordingly passed. After some time, Bury married again, and had a son by his second wife. A question arose, after the lapse of some years, whether the offspring was legitimate, and it was decided that *the second marriage was utterly void*, because the ecclesiastical court had been deceived in the opinion they had given on the impotency of Bury. (Page 23 of the Appendix.)

† A most valuable and learned essay on this subject may be found in the Edin. Med. and Surg. Journal, vol. 1, p. 43 and 132, entitled, "An attempt towards a systematic account of the appearances connected with that mal-conformation of the urinary organs, in which the ureters, instead of terminating in a perfect bladder, open externally on the surface of the abdomen—by Andrew Duncan, jun. M.D." See particularly Matthew Ussem's case, and page 54, on the genital organs of the male.

‡ Belloc, p. 50. Zacchias mentions another case. Dr. Francis states that there is an individual now living in the city of New-York, who, notwithstanding this mal-conformation, has two children. New-York Med. and Phys. Journal, vol. 2, p. 12.

The inability to propel the semen out of its vessels is frequently to be considered as an absolute cause; but generally it is a curable one.* I mention it, however, in this place, for the purpose of stating, that in several instances of this nature there have been found, after death, a diseased state of the prostrate gland, or extensive strictures of the urethra.

The natural want of both testes, provided that ever occurs, or their artificial loss, is another cause. The removal of them by excision, and the frequency of this practice in some countries, is well understood. I may add, that there have been instances in which these organs have suddenly diminished and disappeared, as a consequence of disease or external injury.† The point, however, which excited most discussion in former times was, whether individuals born without any appearance of testes, but who in other respects have the activity and strength that belong to the male sex, are to be considered impotent. It is generally believed not; since it has been well ascertained, that in many instances these organs have not descended from the abdomen, and yet the individual has exhibited every proof of virility. Considerable attention should be directed to the external appearance of the person—his muscular system—the strength of his voice, the presence of the beard, &c. The medical examiner should also examine whether any cicatrix is to be found in the scrotum, indicating castration; or whether, in the room of the testes, there do not exist some hard knots or lumps, proving the existence of former disease. If these are wanting, and the general appearance is virile, we are not justified in considering the individual as impotent.

A different opinion, however, prevailed in former times. Pope Sextus the Fifth declared, in 1587, in a letter to his nuncio in Spain, that all those who were destitute of them should be unmarried; and Philip the Second accordingly executed this order, which affected many in that kingdom. The parliament of Paris also, in 1665, decreed that they should be apparent, in order to permit a person to contract marriage.‡ These, however, are the relics of barbarous ages. Unquestionable facts and anatomical examinations have proved that the conformation in question may be present, without any injury to the generative power. Rolfinck relates the case of an individual distinguished for libertinism, who was executed for some crime. He was, after death, consigned to the dissecting knife; and, on examination, the testes were found in the abdomen.[*] The parents of a young man in a similar situation, consulted a physician as to the propriety of allowing him to marry. He recommended it; and a numerous offspring demonstrated the propriety of his advice.[†]

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* Morgagni declared a case, where the patient was thirty years old, and all the parts were properly formed, to be incurable. This opinion was founded on the idea that some of the internal organs were diseased. Opuscula Miscellànea, p. 48. *Responsum Medico-Legale super seminis emittendi Impotentia.*

† Foderè, vol. 1, p. 369. He observes, that he has witnessed several cases of this kind in deserters, condemned to labour on the canal at Arles. Larrey also states, that many soldiers of the army of Egypt were attacked with a similar complaint. The testes lost their sensibility, became soft, and diminished in size until they were no larger than a white French bean. No venereal disease had preceded these attacks. When both testes were affected with this atrophy, the patient became impotent—the beard grew thin, and the intellect weak. He attributes it to the use of the brandy of dates. Larrey, vol. 1, p. 260.

‡ Mahon, vol. 1, p. 55, 57.

I may also add, in this place, a cause of impotence, concerning which there has existed a considerable diversity of opinion; and that is, the loss of one of the testicles only. If this deprivation be compensated by the healthy size and condition of the other, we have no reason to dread the effects. This actually occurs in some cases of cynanche parotidea, where there has been a translation of the complaint from the neck to the testes. Dr. Robert Hamilton, in one of the best histories that we have of that disease, mentions, that when it was epidemic at Norfolk in England, a patient was seized with swelling of both the testicles. One of them wasted away, until nothing but its coats were left. This occurred in 1762, and in 1769 he had a child, and in 1772 another; both of whom were healthy.[‡] Mahon also mentions that he was acquainted with a young man, in whom one of these organs gradually diminished and withered away, whilst the other increased proportionably in size; and, after this had taken place, he became the father of five children.[§] If, however, the remaining testicle be small and extenuated, or have become schirrous or carcinomatous, or even if the epididymis be tumefied and hard, we have just reason to dread the presence of impotence.

To the above, Foderè adds the following, which may possibly in some cases produce the consequence in question, viz. congenital tumours of a large size; such, for example, as scrotal hernia.[||] This, he supposes, may produce a hardness of the parts, and prevent a secretion of the seminal fluid, by its continued pressure on the spermatic vessels.[¶] The medical college of Western Prussia declared a voluminous and irreducible hernia a sufficient cause of divorce.[**]

Among the curable causes of impotence may be enumerated the following:—An atony of the parts, arising sometimes from local disease or external injury,[††] and at others from masturbation—a retraction of the penis, originating from stone in the bladder, or some other urinary disease—a natural phymosis, which sometimes confines the glans penis in such a manner as to prevent the emission of the semen —and lastly, a mal-conformation as to the place of the aperture of the urethral canal. If this be not too far back, if it be only covered with a membrane, and not obstructed to a great depth, we have reason to hope that modern surgery may remove the difficulty.

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[*] Mœbius, quoted by Mahon ut antea.

[†] Mahon, vol. 1, p. 54. It is stated by Bichat, on the authority of Roux, that very commonly among the inhabitants of Hungary, the testes do not descend till some months, or even years after birth. Brewster's Edinburgh Encyclop. Art. Anatomy, vol. 1, p. 825.

[‡] Transactions of the Royal Society of Edinburgh, vol. 2. Art. 9.

[§] Mahon, vol. 1, p. 59.

[||] In Italy, double hernia, by pressing on the spermatic chords, sometimes causes as complete emasculation as if the testicles were actually removed; so that many of the fine singers of that country are so by the visitation of God.—EDITOR.

[¶] Foderè, vol. 1, p. 372.

[**] Metzger, p. 494. We should not forget that extreme youth is an absolute cause. It has been decided, as far back as the reign of Henry the Sixth in England, that the issue was a bastard, where the husband was within the age of fourteen. See *The King* v. *Luffee*, 8th East's Reports, p. 205.

[††] Dr. Francis mentions, that he has observed the abuse of mercury, and the excessive application of lead injections in gonorrhœa, to cause impotence. New-York Med. and Phys. Journal, vol. 2, p. 12.

The third class of causes, the accidental or temporary ones, is the most important, since they are frequently the subject of legal investigation. They are those which affect an individual during his marriage, and of course have to be considered in cases of contested paternity. The law presumes that the husband is the father of every child conceived during the term of wedlock, yet it allows an investigation as to the chastity of the female. That such is law, in our own and other countries, the following extracts will prove: "In the case of Lomax *versus* Holmden, tried before the court of King's Bench in England, the question at the trial was, whether the plaintiff was the son and heir of Caleb Lomax, Esq. deceased, and this depended on the question of his mother's marriage. And that being fully proved, and evidence given of the husband's being frequently at London, where the mother lived, access was of course presumed. The defendants were then admitted to give evidence of his inability from a bad habit of body. But their evidence *not going to an impossibility, but an improbability only*, this was not thought sufficient, and there was a verdict for the plaintiff."*

The French or Napoleon code, although it does not permit a husband to disavow his child by alleging his *natural impotence*, yet contains a regulation which, in its effects, operates similarly to the principle contained in the English case above quoted. The 312th article says, that the infant conceived during marriage has the husband for its father, but he may notwithstanding disavow it, if he can prove that from the 300th to the 180th day before its birth, there was either an account of absence, or *from the effect of some accident*, a physical impossibility of cohabiting with his wife.*

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* Strange's Reports, vol. 2, p. 940. I am indebted to Dr. Male for the reference to this case. There seems latterly to have been some variation in the rule of law. "Non access is the only ground of disputing the legitimacy in England; but the rule of evidence, in this respect, has been of late materially altered by the opinions of the judges in the Banbury Peerage, who have, it is conceived, introduced an *anomalous* division respecting the evidence of access, dividing it into *access* and *generative access*; so that if this distinction be hereafter recognized, much uncertainty may be introduced respecting the title and accession to property, and a new and difficult subject will demand the attention of the medical student." Brande's Journal, 3, p. 44. I have not been able to obtain a very distinct account of the case above cited, at least in its bearing on the subject now considering: but the following may tend to elucidate the subject: "By the opinion of the judges in the case of the Banbury claim of peerage, it was held, that where the husband and wife are not proved to be impotent, and have had opportunity of access to each other during the period in which a child could be begotten and born in the course of nature, the presumption of legitimacy, arising from the birth of the child during wedlock, may be rebutted by circumstances inducing a contrary presumption; and the fact of a non-access (that is, the non-existence of sexual intercourse,) as well as the fact of impotency, may always be lawfully proved by means of such legal evidence as is strictly admissible in every other case, where a physical fact is to be proved."—Phillips' Law of Evidence, p. 113.

In discussing this subject, it will readily occur that there is a class of diseases, during the progress of which virility may be preserved, while there is another in which it is destroyed. It is not possible, nor indeed would it be proper, to state these except in a general way, since it is difficult to foresee what may hereafter be adduced in contested cases, as a cause of impotence. We shall therefore be understood to mention the diseases, as causing a probability on one or the other side, and not as positive proof.

The diseases that are considered compatible with connexion are those which do not affect the head and sensitive system primarily, and are not accompanied with great debility. Inflammatory and catarrhal fever are of this class. So also in asthma and the early stages of phthisis pulmonalis, the power is preserved. Some diseases appear to stimulate the generative organs, and others, although accompanied with pain, are said to exite desire. Of the first may be named a calculus in the kidneys or bladder; and to the last belong gout and rheumatism.

A man named Aurelius Lingius, aged sixty years, had been affected, during the two last years of his life, with occasional attacks of fever, accompanied with gouty pains, which at intervals made him extremely ill. For the space of two months, however, he appeared on the recovery; when, being seized with a fever and ague, he died. His wife declared herself pregnant, and six months after his death was delivered of a healthy child. Its legitimacy was contested on the ground that the husband, before his last illness, had been incapable; and this opinion was corroborated by his own confession to the physician attending him. His wife allowed the truth of this statement; but asserted that his powers had returned some time before his decease. In this state of the case, Zacchias was consulted; and he decided in favour of the chastity of the wife, for the following reasons: Aurelius had been twice married, and by each wife has had several children. The disease under which he laboured was a heating one, and his powers were probably perfect during the period of convalescence. His age does not prevent the possibility of his producing pregnancy in the female. Symptoms of this were present during his life-time; and although he was known to be extremely jealous, yet his affection remained undiminished towards her. And, finally, the intervals of ease that accompany particular pains, together with the fact that she always reposed in the same bed with him, were, in the mind of Zacchias, conclusive arguments. The judges decided in favour of the female.[*]

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* Foderè, vol. 1, p. 375.

In Scotland, it is only necessary that a man shall be in a situation where a possibility exists of his cohabiting with his wife, in order to constitute him the father of her children, or, as the law beautifully and correctly expresses it, within the four seas of the realm. There is a case at issue in the Court of Session at this moment, where a Miss M'Neil, an heiress, is claimed by two husbands. The one asserts, that he married many years ago, and cohabited with her one night only; the other married her since, and has by her a family; but it seems to be the general opinion, that if the first husband proves her to be his wife, the children must be his as a matter of course.—EDITOR.

In connexion with the facts already stated, it may be proper to add a circumstance suggested by the author just quoted. He deems it possible that certain diseases may so change the state of the system, as to produce an alteration in the generative power. He quotes the testimony of Avenzoes, who had no children during the whole period of youth, but became a father shortly after recovering from a violent fever. And also the case, which came under his own observation, of an artificer, who lived twenty-four years with his wife without issue: shortly after his convalescence from illness, he became a father, and afterwards had many children.[†]

The diseases which we may rationally suppose will prevent cohabitation, are the following: A mutilation, or severe wounds of the sexual organs—carcinoma of the testicles or penis—gangrene of the lower extremities—immoderate evacuations of blood or bile, or of the fæces—scorbutic cachexia—marasmus—peripneumony and hydrothorax—anasarca in its perfect state, particularly if accompanied with an infiltration into the sexual organs—nervous and malignant fevers, particularly if they affect the brain, and are accompanied with great debility and loss of memory—all affections of the head and spinal marrow, whether from a fall, blow, wound, or poison;[‡] or from external causes, as apoplexy, palsy, or other comatose diseases. If the infant is conceived whilst the husband has been known to have laboured under either of these maladies, the presumption is certainly against its legitimacy. So also, if he be affected with leprosy, venereal ozœna, severe cutaneous diseases, or insanity, we may reasonably doubt the fact of cohabitation, from the fear that we may suppose the female has experienced, lest she should be contaminated, or from the dread that she has entertained of having communication with the individual.

We come now to the consideration of impotence in the female. And here it is to be observed, that even if the causes of it be removed, yet sterility, or an inability to conceive, may still exist. It will, therefore, be proper to notice the causes of impotence and sterility in succession. They may each be divided into incurable and curable.

The incurable causes of impotence are, 1. An obliteration or thickening of the sexual organs, so as to prevent any introduction: and this may depend either on the soft or the hard parts. To the former belongs a mal-conformation of the pelvis, or extensive exostosis. I shall, however, hereafter notice the disease usually denominated

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[*] Zacchias. Quest. Med. Legal, Consilium, 23.

A friend of mine, who studied in the Hospital of New-York, informed me, that after recovering from the yellow fever, the patients displayed most furious sexual passion, to the great inconvenience of the nurses, and other female attendants.—EDITOR.

[†] Zacchias, vol. 1, p. 271.

[‡] Foderè mentions the case of a person, aged forty, who laboured under temporary impotence during the space of six months, from exposure to charcoal vapours. This state of the system was left after the recovery from the immediate danger. Vol. 1, p. 382.

mollities ossium, which frequently produces the most shocking deformity; and where, notwithstanding this, patients have frequently conceived. The imminent danger, both to mother and child, that is present, will be considered when treating of the cæsarean operation. At present we barely remark, that there may be such a curvature of the spine, and distortion of the bones of the pelvis, as to prevent cohabitation.

The vagina and womb have also been closed with a dense fleshy substance. Morgagni mentions cases in which there was a continuity of it, without any aperture. A similar instance is stated by Dr. Mott, where an operation led to no useful result; and he advances the opinion that the female is destitute both of vagina and uterus. She never menstruates, but every month is seized for a day or two with active diarrhœa.*

Foderè also relates the following case from the *Causes Célèbres.* In 1772, a young woman, aged twenty-five, in good health, was married at Paris. Six years elapsed without consummating the nuptials; at the end of which, she consented to be visited by a midwife. This person declared that she could find none of the sexual organs, and that their place was occupied by a solid body. The female stated at this time, that though in good health, she had never been subject to the menses. A surgeon named Dejours was afterwards called in; and, on examination, he supposed that an incision into this solid mass might remedy the inconvenience; and he accordingly performed it in 1734, but without success; as after cutting down two inches, he still found the mass in equal quantity, and the hope of its being a superficial obstruction was destroyed. He contented himself with keeping the wound open, and an aperture was thus preserved. In the year 1742, the husband applied to the court to annul the marriage. Levret and Sautnet, on being consulted, stated that they had found an aperture of two or three inches in length; that the cicatrix of the former operation still remained; and that either through fear, or the prudence of the surgeon, it had not been sufficiently extensive to remove the obstacles. Ferrin, Petit, and Morand, on the other hand, deposed, that the operation had been properly performed, and that it was not probable that the parts necessary for generation had ever been present, either before or after marriage. The court, however, refused to annul the connection, from an idea that a cure was practicable. The female died at Lyons about ten years after; and, on dissection, the vagina and uterus were found to constitute one solid mass, without any cavity in either.†

2. Another incurable cause, both of impotency and sterility, is a natural or fistulous communication of the vagina with the bladder or

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* New-York Med. and Phys. Journal, vol. 2, p. 19. A case, probably of the same nature, is mentioned in the Lond. Med. Repository, vol. 8, p. 347.

Richerand mentions a similar case, in which nature was periodically relieved by a discharge of bloody urine.—EDITOR.

† Foderè, vol. 1, p. 385.

rectum. Foderè mentions cases of this nature, where the female menstruated by the rectum, and every possible remedy failed of success. The vagina was extremely contracted. 3. A prolapsus or retroversion of the uterus, or a prolapsus of the vagina. These are of course curable during their first stages; but instances have occurred where they are of long standing, and cannot be reduced, since the introduction of the fingers causes the most vivid pain. 4. A cancer of the vagina or uterus, from the pain that accompanies it, may be considered as an absolute cause.[*]

The curable causes are, 1. A dense substance covering the orifice of the vagina. Parè, Ruysch, Fabricius, and many others, relate cases of this kind, in some of which the membrane, which is generally the hymen, was so strong, that the menstrual blood was accumulated behind it in large quantities. Foderè quotes a case from Fabricius, where the husband demanded a dissolution of the marriage, from the impossibility of having perfect connection. The female, however, declared herself pregnant, and by an incision into the membrane, the obstacle was removed, and the pregnancy completed at the time indicated.[†] Dr. Physick is also stated to have operated with success in a case where the vagina was entirely closed up to a considerable distance within the os externum.[‡] 2. An extreme narrowness of the vagina. Should pregnancy intervene, no apprehension need be entertained of the result in this case, as it has been repeatedly observed, that a dilatation gradually takes place before the period of delivery. It may be remarked, however, that this occurs more readily in young females, than in those of advanced years. 3. Independent of the natural narrowness just mentioned, there is a similar affection that occasionally originates from accidental causes, such as tumours and calosities, cicatrices remaining after the cure of ulcers, or from lacerations after difficult labour. A dilatation of these may be made, according to the rules of modern surgery.[§] 4. We may add, long-continued hæmorrhage, recent prolapsus of the uterus or vagina, and even protracted fluor albus, to the above. They prevent connection from the pain that occurs, or the diseased state that is present.

The causes of sterility, of an incurable nature, and sensible to the sight or touch during life, may be stated thus: A schirrous or cartilaginous uterus—stricture in the cavity of that organ[||]—a polypus in the interior of the uterus—enlarged and scirrhous ovaria. The want of the uterus, should that occur, is seldom known till after death.[¶]

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[*] In the New-England Journal, vol. 9, p. 161, is a case related on the authority of M. Lessere, which evidently proves the position laid down in the text.

[†] Foderè, 1, 389. [‡] Dorsey's Surgery, vol. 2, p. 368.

[§] In the Medico-Chirug. Trans. vol. 8, p. 445, a case is related of a negress in Jamaica, in whom there was a complete adhesion of the labia, and she asserted that it was owing to an operation performed in Africa, for the purpose of preserving the chastity of the female.

[||] Baillie's Morbid Anatomy, p. 871. "Slight inflammation (he observes) may induce this, and the obliteration particularly occurs in that part where the cavity is narrowest."

[¶] See Mem. Med. Soc. Lon. vol. 4, p. 94. (The uterus, on dissection, was found wanting.) See also Burns' Midwifery, chap. iv. note 47, for references. A case was

The causes which may be curable, are, an obliquity in the position of the uterus—too great irritability of that organ—excessive menstruation—leucorrhea—retention of the menses.* This last, however, is not by any means a certain cause of sterility, as women have become pregnant without the menses ever occurring.

In concluding this subject, it is proper to add, that there are many cases of constitutional sterility, which we cannot explain. These, however, are never a subject of judicial inquiry.†

In this country, the English law, as already cited, is in force, and the presence of impotence before marriage is a sufficient cause for dissolving that connection. Applications have also been repeatedly

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lately read before a medical society in Berlin, by Dr. Stein, of a married female, aged twenty-four years, well formed, slender, and delicate, with full breasts, whose vagina was found imperforated; and on performing the necessary operation, no uterus could be discovered, but its place was supplied by a soft mass of cellular tissue. She had never menstruated, although there was a regular return of the orgasm experienced at the catamenial periods. The author infers that it is the ovaria, and not the uterus, which, by their influence, give to the woman her characteristics, in respect to form and manners; and this opinion is supported by some cases, which I shall hereafter quote. (See Annals of Philosophy, vol. 16, p. 114.) The 46th letter of Morgagni (De Caus. and Sedib.) is highly worthy of examination on the subject of sterility.

* Foderè and Mahon mention dropsy (hydatids) and tympany of the womb as causes. Denman, however, observes, that according to his experience, they have not prevented conception. (Francis' Denman, p. 148 and 149.)

† I have already referred to Dr. Duncan's Essay; and will only add, that it contains a notice of mal-conformations in the genital organs of both sexes, as connected with deficiency of the urinary bladder. Copious references are given to all preceding cases on record. See Edin. Med. and Surg. Journal, vol. 1, p. 132. Cases of female mal-conformations are also contained in Edin. Med. and Surg. Journal, vol. 1, p. 132. Cases of female mal-conformations are also contained in Edin. Med. and Surg. Journal, vol. 1, p. 39, by Mr. Coates; vol. 1, p. 128, by Astley Cooper, Esq. and vol. 7, p. 23, by Mr. Conquest. It seems, from the case of the Cornish woman related in the Philosophical Transactions by Dr. Huxham, that females are capable of being impregnated, notwithstanding a serious mal-conformation of the urinary organs: vol. 32, p. 408; as also, vol. 20, p. 56.—As I have only noticed, in the text, those causes of sterility which are sensible to the sight or touch, it may be proper to add the following; which is, strictly speaking, a case presenting every probability of marriage proving sterile, but yet not sufficient, until dissection verifies it, to prove its certainty. It is taken from the Philos. Transactions, 1805, Part II. and related by Mr. Charles Pears, F. L. S. The woman died at the age of twenty-nine. Her stature was about four feet six inches, having ceased to grow at ten years of age. She never menstruated; her breasts and nipples never enlarged more than in the male subject; there was no appearance of hair on the pubes, and she never shewed any passion for the male sex. On dissection, the ostincæ and uterus were found of the usual form, but had never increased beyond their size in the infant state; the passage into the uterus through the cervix, was oblique; the cavity of the uterus of the common shape, and the fallopian tubes were pervious to the fimbriæ; the coats of the uterus were membranous; *and the ovaria were so indistinct, as rather to shew the rudiments which ought to have formed them, than any part of their natural structure.* Edin. Med. and Surg. Journal, vol. 3, p. 105.—Probably the only case in which the ovaria have been removed in the human subject, is that related by Mr. Pott. See his works, vol. 2, p. 210. They were removed in a case of inguinal hernia, by a surgical operation. Before this period, the female (aged twenty-three) was stout, large-breasted, and menstruated regularly; afterwards, although she enjoyed good health, she became thinner, her breasts were gone, and she never menstruated.

made to the legislature of the state of New-York for a divorce, on the ground of impotence supervening after marriage, but they have been uniformly rejected.*

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* There is one case decided during the period when New-York was a colony, which, from its singularity, deserves mention. I am indebted for it to the kindness of John V. N. Yates, Esq. secretary of state; and as it has never been published, I prefer giving the proceedings at full length, as copied from the records.

"Nicholas W———, of Oysterbay, on behalf of Rebekah, his daughter, wife of Eleazer L———, of Huntingdon, made complaint unto me of the uncomfortable condition wherein his said daughter hath, for divers years past, lived with her said husband; and there having been formerly several complaints made, both on the part of the relations of the husband, as well as those of the wife, suggesting some notorious fault or impediment on the one side or the other, which hitherto hath not been fully or clearly made appear, so that mutual discords and differences do still continue. To the end a fair composure of the same may be effected, or some other lawful course taken therein, I have, by and with the advice and consent of my council, thought fit to ordain and appoint, and by these presents do ordain and appoint, that Eleazer L——— and Rebekah, his wife, do appear now in this city, upon Wednesday, the fourth of May next, before a special court appointed to examine into and determine the matter in difference between them; and all persons concerned, or that can give in evidence on either part, are hereby required to make their appearance before the said court, for the better clearing of the truth, so that the controversy may be decided according to law and good conscience. Given under my hand at Fort James, in New-York, this 1st day of April, 1670.

"FRANCIS LOVELACE, Governor."

Volume marked "Court of Assize, 1665 to 1672"—vol. 2, p. 139.

A Commission, &c.

"Whereas complaint hath been made unto me by Nicholas W———, on the behalf of Rebekah, his daughter, against Eleazer L———, her husband, and also by the said Rebekah against him the said Eleazer, that having been joined in matrimony for the space of seven years and a half, or thereabouts, he the said husband hath not performed conjugal rights unto his wife, but on the contrary hath caused her to lead a very uncomfortable life with him; and the said father and daughter, upon supposition of impotency and insufficiency in the said Eleazer L———, having sued for a divorce, the hearing and examination into which matter I do not judge meet should come on before a public court, I have therefore thought fit to nominate and appoint, and by these presents do hereby nominate and appoint, Thomas Lovelace, Esq. Mr. Samuel Maverick, Mr. Matthias Nicolls, Capt. John Manning, and Mr. Humphrey Davenport, to be commissioners, to meet at some convenient place this afternoon, then and there to hear and examine into this matter in difference between the said Eleazer L——— and Rebekah, his wife. To which end, you are to call both parties before you, or whosoever also can give evidence or testimony in the matter; to whom ye may administer an oath, for the better clearing of the truth; which oath you are hereby empowered to give; as also to employ any other person or persons skilful in such matters, to make inquiry into the defect and impediments alleged; whereupon you are to give judgment, and render an account, that I may make some final determination thereupon. Given under my hand and seal, this sixth day of May, in the 22d year of his Majesty's reign, A. D. 1670."—Ibid. p. 175.

A Divorce granted to Rebekah W———, from Eleazer L———.

"Whereas Nicholas W———, of Oysterbay, on the behalf of his daughter Rebekah, the wife of Eleazer L———, and the said Rebekah for herself, did make their complaint unto me against the said Eleazer L———, her husband; that she having been his reputed wife for the space of seven years and a half, she hath not in all that time received any due benevolence from her said husband, according to the true intention of matrimony, the great end of which is not only to extinguish those fleshly desires and appetites incident to human nature, but likewise for the well-ordering and con-

CHAPTER IV.

DOUBTFUL SEX.

Denial of the existence of hermaphrodites in the ancient sense of the term. Notice of the various mal-conformations that have been observed. 1. Individuals exhibiting a mixture of the sexual organs, but neither of them entire. 2. Males with unusual formations of the urinary and generative organs. 3. Females with unusual formations of the generative organs. Ancient laws concerning hermaphrodites—English common law concerning them.

The ancients have several fables founded on the idea of the union of the qualities of the male and female in the same individual. One of the personages who was supposed to be thus endowed, was named Hermaphroditus; and from him the term *hermaphrodite* has come into general use, as applicable to this class of beings. Although formerly credited, yet it is now agreed that no such individual of the human species has ever existed; but it is equally well established, that many cases of extraordinary mal-conformations have occurred. I conceive, that the most useful notice of this subject will be, to relate the more remarkable cases, according to the arrangement usually adopted by writers of the present day.

Considering, therefore, the subject of proper hermaphrodites, or those endowed with the sexual organs of both sexes entire, and capable of performing the generative functions, as fabulous, we shall examine those to whom the above term is at present commonly applied, under three classes.

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firmation of the right of meum and tuum, to be devolved upon the posterity lawfully begotten betwixt man and wife, according to the laws of the land and practice of all Christian nations, in that case provided; and did therefore sue for a divorce. Whereupon, having appointed commissioners to call both parties before them, and strictly to examine into the affair, and to make report of their judgment thereupon; the which, after serious inquiry made by them, with the advice of chirurgeons well skilled, and sober matrons, who privily examined both the man and the woman, they made report of their judgment and opinion, that the defect was in the husband, and not in the wife; and there was sufficient ground for a divorce. All which being afterwards represented to my council, and they having declared themselves in the same opinion. For the reasons afore specified, the pretended marriage between the said Eleazer L——— and Rebekah W———, is hereby adjudged and declared to be void, null, and invalid, together with all the consequences thereof; and the said Rebekah W——— is hereby acquitted, made free, and divorced from all pretences of marriage, or matrimonial ties and obligations between her and the said Eleazer; and the said Rebekah hath likewise free liberty to dispose of herself in lawful marriage with any person, as if the ties and obligations between her and the said Eleazer had never been. Given under my hand, and sealed with the seal of the province, this 22d day of October, in the 22d year of his majesty's reign, A.D. 1670."—Ib. p. 260.

1. *Individuals exhibiting a mixture of the sexual organs, but neither of them entire.* Examples of this class are rare; and even these, when closely examined, show the predominance of one or other sex. Dr. Baillie mentions a case which was communicated to him by Dr. Storer, of Nottingham. "The person," he observes, "bears a woman's name, and wears the dress of a woman. She has a remarkable masculine look, with plain features, but no beard. She has never menstruated; and, on this account, she was desired by the lady with whom she lived as a servant, to become an out-patient in the Nottingham hospital. At this time she was twenty-four years of age, and had not been sensible of any bad health, but only came to the hospital in order to comply with the wishes of her mistress. Various medicines were tried without effect; which led to the suspicion of the hymen being imperforated, and the menstrual blood having accumulated behind it. She was, therefore, examined by Mr. Wright, one of the surgeons to the hospital, and by Dr. Storer. The vagina was found to terminate in a cul-de-sac, two inches from the external surface of the labia. The head of the clitoris, and the external orifice of the meatus urinæ, appeared as in the natural structure of a female; but there were no nymphæ. The labia were more pendulous than usual, and contained each of them a body resembling a testicle of a moderate size, with its cord. The mammæ resembled those of a woman. The person had no desire or partiality whatever for either sex."*

The Memoirs of the Academy of Dijon contain the following case, communicated by M. Maret. Hubert J. Pierre died at the hospital in October, 1767, aged 17 years. Particular circumstances had led to a suspicion of his sex; and these induced an examination after death.

His general appearance was more delicate than that of the male; and there was no down on his chin or upper lip. The breasts were of the middle size, and had each a large areola. The bust resembled a female; but the lower part of the body had not that enlargement about the hips, which is usually observed at his age. On examining the sexual organs, a body four inches in length, and of proportionate thickness, resembling the penis, was found at the symphysis pubis. It was furnished with a glans to cover the prepuce; and at its extremity, where the urethra usually opens, was an indentation. On raising this penis, it was observed to cover a large fissure, the sides of which resembled the labia of a female. At the left side of this opening, there was a small round body like a testicle, but none on the right. However, if the abdomen was pressed, a similar body descended through the ring. When the labia were pushed aside, spongy bodies resembling the nymphæ were seen; and between these, and at their upper part, the urethra opened as in the female, while below these was a very narrow aperture, covered with a semilunar membrane. A small excrescence, placed laterally, and having the appearance of a caruncula myrtiformis, completed the similarity of this fissure to the orifice of the vagina. On further examination, the penis was found to be imperforate; the testicle of the left side had its spermatic vessels and vas deferens, which led to the vesiculæ seminales. By making an incision into the semi-lunar membrane, a canal one inch in length, and half an inch in diameter, was seen, situated between the rectum and bladder. Its identity with a vagina was, however, destroyed, by finding at its lower part, the verumontanum and the seminal orifices, from which, by pressure, a fluid, resembling semen in all its properties, flowed. The most astonishing discovery was, however, yet to be made. The supposed vagina, together with the bladder and testicles was removed. An incision was made down to the body noticed on the right side. It was contained in a sac, filled with a limpid and red-coloured liquor. From its upper part on the right side, a fallopian tube passed off, which was prepared to embrace an ovarium placed near it. It seemed thus proved that the body in question was a uterus, though a very small and imperfect one; and on blowing into it, air passed through to the tube.*

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* Morbid Anatomy, third edition, p. 410.

Giraud dissected a subject at the Hotel Dieu, who, during life, had been received in society as a woman, and was connected by a voluntary association with a man, who had for a long time performed the duties of a husband towards her. The bust had a masculine appearance, the chin was covered with firm hairs, very analogous to a beard, the neck was thick, the chest broad, the bosom slightly swollen, and the nipples exactly like those of a man. The lower half of the body presented a contrast to these characters. The soft and delicate contours of the lower limbs, the rounded hips, the broad pelvis, and the greater separation of the thighs, approximated decidedly to the female form. An imperforate penis, two testicles, and an appearance of vulva, were the external generative organs. The testes were well formed, the vesiculæ seminales imperfect, and the urethra opened at the cul-de-sac, which represented the vagina.†

The case of the child examined by Professor Ackermann, of Jena, probably belongs to this division. It was born at Mentz, on the 14th of June, 1803, and died on the 25th of the month following. Dr. Ackermann viewed the body during life, and also dissected it after death. The penis was little more than an inch long, the glans was distinct about one-third of its whole length, but imperforated; there was, however, a depression where the urethra should have opened. On raising this cliteroid penis, as he calls it, an opening was observed, which was the orifice of a canal, one inch in length. The uterus and urethra opened into the posterior part of this canal, and the testicles, with their tunicæ vaginales, were found in the labia. As to the internal organs, the urinary bladder occupied its usual place; one of the testicles had descended into the scrotum, and the other had advanced no farther than the groin; both were perfect, and had their usual appendages complete. In the place usually occupied by the female uterus, there was found an organ closely resembling it. Its figure was pyriform, and it opened by a round orifice into the *vagina urethralis*, as he styles the canal, a little before the orifice of the urethra. The vasa deferentia penetrated the substance of the uretus, at the points where the fallopian tubes are usually placed, but without opening here, passed on, and at length terminated by very small orifices in the vagina urethralis.*

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* Mahon, vol. 1, p. 100.

† Rees' Cyclopedia, art. Generation. The case is quoted from the Journal de Medecine, par Sedillot.

Other cases are mentioned by various authors, but the similarity between them is so great, as to render a farther detail unnecessary. The examples now given, show the greatest deviations from the perfect structure that have been observed. And it will lead to clearer views concerning them, if we adopt the opinions of the reviewer of Ackermann, in the journal already quoted. "In the two sexes, there are organs which correspond to each other, and which may be called analogous organs, the penis to the clitoris, the scrotum to the labia, the testes to the ovaria, and the prostrate to the uterus; and it farther appears, that of these analogous organs, no two were ever found together in the same individual. *No monster has been described, having both a penis and clitoris, nor with a testis and ovarium of the same side, we may venture to say, with testes and ovaria, nor one having a prostrate and uterus.*" This distinction will invalidate the account given by Maret, so far as it relates to the presence of an ovarium and a fallopian tube. But I suggest whether it is not probable that the organ in question was a testicle, and its appendages malformed. The idea of our author is also no doubt correct, that in repeated instances the part deemed to be a uterus, is a *mal-formed prostrate.* "The proof rises almost to certainty, when we recollect that the prostrate is the only male organ not accounted for in the hermaphrodite."†

If these views be adopted, and they are certainly consonant with the present state of anatomical science, it will follow as a result, that beings of this class are to be considered as males. It need hardly be added that they are impotent.

2. *Male individuals with unusual formations of the urinary and generative organs,* (androgyni.) "The ambiguity in these cases depends commonly on the testes being contained in separate parallel folds of the skin; the penis being imperforate, and the urethra opening in the perinæum, on the surface of a blind aperture, having a red and tender appearance, and easily mistaken for the vagina. In such an individual, the penis being imperforate, and probably smaller than usual, is considered as a large clitoris; the folds of the skin holding the testes, very much resemble the female labia, and the red slit behind which the urethra ends, is tolerably analogous to the vagina."‡

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* Edinburgh Med. and Surg. Journal, vol. 8, p. 202. Review of "*Infantis Androgyni Historia et Ichnographia,*" &c. Auctore I. F. Ackermann.

† Edin. Med. and Surg. Journal, vol. 8, p. 208.

‡ Rees' Cyclopedia, article *Generation.*

A marine, answering perfectly to this description, was sent to the hospital at Toulon, in 1799, as an hermaphrodite. He was about twenty years of age, with little beard, and breasts resembling those of a girl at sixteen. A discharge from the service was procured for him.* Individuals of this class, appear to have the testes and vesiculæ seminales perfect, but they must evidently be impotent from the imperforation of the penis, and the opening of the ejaculatory ducts near the perinæum. Here the semen is of course expelled.

Deviations less marked have also been observed, and among others, a confinement of the penis to the scrotum, by a particular formation of the integuments, has occasioned persons to be reputed hermaphrodites. In these, the urine passes in the direction downwards, and the confinement of the organ will not allow of its performing the sexual functions. Mr. Brand relates, that being consulted in 1779, on occasion of some complaint in the groin of a child, about seven years of age, he found a vicious structure of the sexual organs, consisting in the presence of such an unnatural integument. This child had been baptized and brought up a girl, but it was evident to him erroneously; as the male organs were present. By a slight incision, he liberated the restricted parts, and proved to the parents, that they had mistaken a boy for a girl.†

Lastly, males are supposed to be hermaphrodites, when the urinary bladder is deficient, together with the lower and anterior portion of the abdominal muscles and integuments, while a red and sensible mass of an irregular fungous-like substance, with the ureters opening on it, is placed at the lower part of the abdomen. I have already referred to the elaborate essay of Dr. Duncan, jun. on this subject. He has collected a great number of cases, and from his deductions, it appears that important alterations in the generative organs are generally observed, in consequence of this deformity. The urethra is deficient, and the penis consequently imperforate. It is also very short—never exceeding two inches, even in the adult. The vesiculæ seminales open near the fungous mass above mentioned, or in the urethra, or in a small tubercle at the root of the penis. The testicles are generally natural, either contained in the scrotum, or they have not descended. The sexual appetite in some of these individuals has been weak; in others strong; in others altogether wanting. They are not capable of procreating the species, in consequence of the shortness and imperforation of the penis, and the seminal ducts opening externally.‡

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* Foderè, vol. 1, p. 357. An instructive case, accompanied with a plate, is related by J. S. Soden, surgeon, at Coventry. The individual resided at that place, and wore the attire of a female. The beard was strong; the breasts flat; and the hips straight. The genital organs generally resembled the above description. The scrotum contained the testicles, but it was divided, and resembled the labia. The urine was evacuated at the perinæum.—Edin. Med. and Surg. Journal, vol. 4, p. 32. There certainly can be no doubt of this person being a male.

† *Brand*, quoted in Brewster's Edinburgh Encyclopedia, Article *Hermaphrodites*.

‡ Edin. Med. and Surg. Journal, vol. 1, p. 54 to 58. The following is an exception to the general rule, unless we suppose the mal-conformation to have been slight,

3. *Females with unusual formation of the generative organs,* (androgynæ.) An enlargement of the clitoris is probably the most common cause that has led to mistakes concerning this sex. It seldom occurs in Europe, but is quite frequent in warm climates, insomuch that excision of it is said to be sometimes practised.

Sir Everard Home relates an instance in a Mandingo negress, aged twenty-four years. Her breasts were very flat; her voice was rough, and her countenance masculine. The clitoris was two inches long, and in thickness resembled a common-sized thumb; when viewed at some distance, the end appeared round, and of a red colour; but on a closer inspection, was found to be more pointed than that of a penis—not flat below, and having neither prepuce nor perforation. When handled, it became half erected, and was then three inches long, and much larger than before; and on voiding her urine, she was obliged to lift it up, as it completely covered the orifice of the urethra. The other parts of the female organs were found to be in a natural state.[*] It is proper to observe in this place, that in new-born children the clitoris is proportionably very large.

In 1814, a female named Mary Magdalen Lefort, excited great attention in Paris, as a reputed hermaphrodite. She was examined by a committee of the *Faculté de Medicine* of that city, (consisting of Chaussier, Petit-Radel and Beclard;) and from their report, and the remarks of Dr. Granville on it, the following particulars are drawn: She was sixteen years of age. The breasts and upper extremities resembled those of a man. The upper lip and chin were covered with a beard. The clitoris emerged from under the symphysis pubis, and shooting out from between the superior part of the labia, terminated by an imperforated glans. At the root of the clitoris is an opening, through which the urine and menses flowed. On separating the labia, a thick membrane was seen to extend from the one to the other, and from the lower angle formed by their union, upwards as far as the prominent clitoris already described. Dr. Granville supposes that this membranous partition covers the orifice of the vagina, and that an incision made into it would at once expose that cavity in its natural state. The urethra, in the present instance, is produced under the clitoris; and it is this circumstance which constitutes its

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and the prevalent opinion to have been drawn from the appearance. "In the year preceding, (1459) there was a bairn, which had the kinds of male and female, called in our language a scarcht, in whom man's nature did prevail: But because his disposition and portraiture of body represented a woman, in a man's house of Linlithgow, he associated in bedding with the good man's daughter of the house, and made her to conceive a child, which being divulgate through the country, and the matrons understanding this damsel deceived on in this manner, and being offended that the monstrous beast should set himself forth as a woman, being a very man, they got him accused and convicted in judgment for to be burnt quick, for this shameful behaviour."—Piscottie's History of Scotland. Edin. 1778, p. 104.

[*] See Home on Hermaphrodites. Philos. Trans. vol. 69, p. 157. Many other cases are said to be collected in the work of Dr. Parsons on Hermaphrodites. See a case by him of a French girl, in Phil. Transactions, vol. 47, p. 142.

resemblance to a penis. But the presence of organs essential to the female, such as the uterus and vagina, leave no doubt of her sex.*

A prolapsus of the uterus is another circumstance which has occasioned females to be deemed hermaphrodites. Margaret Malaure came to Paris in 1693, dressed as a man. She considered herself as possessing the organs of both sexes, and stated that she was able to employ both. Her person was exhibited; and several physicians and surgeons agreed with the common opinion so much, as to give certificates that she was an hermaphrodite. Saviard, an eminent surgeon, was, however, incredulous. He examined her in the presence of his brother practitioners, and found that she had a prolapsus uteri, which he reduced.†

Sir Everard Home mentions a similar case of a French woman, whom he himself examined. She was shown as a curiosity; and, in the course of a few weeks, made £400. The prolapsus was evident on inspection. She, however, pretended to have the powers of a male.‡

It will readily be observed, from the above illustrations, that all the cases of supposed hermaphrodites are referable to the classes now described. They are either males, with some unusual organization or position of the urinary or generative organs; or females with an enlarged clitoris, or prolapsed uterus; or individuals in whom the generative organs have not produced their usual effect in influencing the developement of the body. Thus it is evident, that, instead of combining the powers of both sexes, they are for the most part incapable of exerting any sexual function.

Yet the prejudices of ancient nations seem to have marked these unfortunate individuals as objects of persecution, and to have subjected them to the operation of the most absurd and cruel laws. Diodorus mentions that they had been burned by the Athenians and Romans. At an early period of Roman history, a law was enacted, that every child of this description should be shut up in a chest, and thrown into the sea; and Livy gives an instance, where, on some difficulty with respect to the sex of a newly-born infant, it was directed to be thrown into the sea—*tanquam fœdum et turpe prodigium.*§ The Jewish Talmud, we are told, contains many ordinances founded on the apparent predominance of sex.

The canon and civil law have also many enactments concerning them. Among other questions vigorously debated, was that whether they should be allowed to marry; and it appears that they were even not prevented; but if the two sexes were equal, a choice of the object was left. Some learned opinions on this subject may be found in Valentini.||

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* London Med. Repository, vol. 4, p. 414.

† Mahon, vol. 1, p. 96.

‡ Home ut antea. A case similar to the above is related in Valentini Pandectæ, vol. 1, p. 88.

§ Livy, 27, 37. Eutropius, 4, 36.

|| Novellæ Cas 10, de matrimonia hermaphroditi.

Hermaphrodites could not, however, be promoted to holy orders, on account of their deformity or monstrosity; nor could they be appointed judges, "because they are ranked with infamous persons, to whom the gates of dignity should not be opened."

An old French law allowed them great latitude. It enacted that hermaphrodites should choose one sex, and keep to it.*

These absurd notions and practices have now disappeared; but the subject is, notwithstanding, important on many accounts, as these unusual deviations often render the sex of an individual doubtful, and impose even on professional persons. The decision may be important in deciding the employment in life of an individual, the descent of property, and the judicial decisions concerning impotence or sterility. Thus, Mr. Ferrein, a modern physician, informs us, that he was consulted by the relatives of a young nobleman labouring under a dubious conformation, who, if a male, as was commonly believed by them, would inherit a considerable estate, but to which he could have no right if he belonged to the other sex. The whole external mien resembled that of girls of twelve years of age; the breasts were quite flat, and the voice masculine. An external sexual organ of small size was present, but without a urethra. In the scrotum was a deep fissure, through which the urine was discharged. He was induced to declare her a female, and that she would consequently lose the expected inheritance. This decision is, however, incorrect, at least if we adopt the views already laid down.

The following circumstances are worthy of notice, in forming our opinions on contested cases. The beard, the hair on various parts of the body—the desires excited by the presence of women—the testes and their cords, and the comparatively greater breadth of the shoulders than that of the pelvis and hips, show us that the individual is a man. The smoothness and softness of the body in general—the absence of the beard, and of hair on the body—the menstrual discharge—the want of testes, and the superior breadth of the hips, prove the individual to be a woman.

On proceeding to the sexual organs, a male with a fissure in the perinæum, and an imperforate penis, may be ascertained by the size of the penis; by the different organization of the prepuce from that which covers the clitoris; by the absence of nymphæ and hymen, and probably by the presence of testes. The different relation of the fissure in the perinæum to the penis, from that of the meatus urinarius to the clitoris in the female, will assist the decision; as also the want of power to pass an instrument towards the situation of the uterus.

On the other hand, a female is indicated by the size of the clitoris, and its different shape; by the connection of its prepuce with the nymphæ, and the presence of the latter parts; by the separate opening of the vagina and meatus urinarius, and by the presence of the hymen, and the absence of the testicles.

All these circumstances now enumerated, tend to assist us in viewing the adult; but the difficulty is much increased with new-born children. In such instances, a close and accurate examination is required, founded on the distinctions already laid down, so far as they are applicable.*

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* Male, p. 278.

The English common law on this subject, and which of course is binding in this country, is thus laid down by Blackstone and Coke: "A monster having deformity in any part of its body, yet if it hath human shape, may inherit.†" And "every heir is either a male or a female, or an hermaphrodite, that is, both male and female. And an hermaphrodite (which is also called androgynus) shall be heir either as a male or female, according to that kind of sex which doth prevail; and accordingly it ought to be baptized.‡" The same rule, he observes, (*hermaphrodita tam masculo quam feminæ comparatum secundum prævalescentiam sexûs incalescentis,*) guides in cases concerning tenant by the curtesy.§

CHAPTER V.

RAPE.

Signs of virginity—opinion of anatomists concerning them. 2. Signs of defloration and rape. Diseases that may be mistaken for the effects of violence. Possibility of consummating a rape. False accusations. Appearances when death has followed violation. 3. Laws of various countries as to the violation of children under ten years of age. Credibility of witnesses in these cases. Laws of various countries concerning rape. Discussion as to the circumstances which constitute the crime in law. 4. Whether the presence of the venereal in the female should invalidate her accusation. Of rape during sleep without the female's knowledge. Of pregnancy following rape. Law on this point.

No case can occur, in which public feeling is more warmly or justly excited, than where an attempt is made to injure or destroy the purity of the female. According to our system of laws, the testimony of the insulted individual is sufficient to condemn the criminal; yet, notwithstanding this correct disposition, it not unfrequently occurs, that the opinion of the physician is required, in order to elucidate various difficulties connected with the accusation. I shall, therefore, follow the plan pursued by all systematic writers on this subject, and commence with a notice of the signs of virginity. A knowledge of these is generally required in cases where children of a tender age have been abused; and again, they need to be known in those instances, where malicious charges have been made by abandoned females. No remark can be more correct than that of Sir Matthew Hale, concerning this crime: "It is an accusation," says he, "easy to be made and harder to be proved, but harder to be defended by the party accused, though innocent." The signs of rape will necessarily form the second division; thirdly, the laws of various countries on that crime; and, lastly, an examination of some medico-legal questions connected with the subject.

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* I am much indebted, on this subject, to the articles *Generation* in Rees' Cyclopedia, and *Hermaphrodites* in Brewster's. The former is an elaborate and able production, from the pen of Mr. William Lawrence.

† Blackstone, 2. 247. ‡ Coke Littleton, 8. a. § Do. 29. b.

1. The physical signs of virginity have been the subject of keen discussion among anatomists and physiologists, and none of them has led to greater enquiry, than the *existence of the hymen*. This is understood to be a membrane of a semilunar, or occasionally of a circular form, which closes the orifice of the vagina, leaving however an aperture sufficiently large to permit the menses to pass. A great difference of opinion has existed concerning its presence. Some distinguished physiologists have denied its existence altogether, or, in the cases where it is found, consider it a non-natural or morbid occurrence. Among these, may be enumerated, Ambrose Parè, Palfyn, Pinæus, Columbus, Dionis, and Buffon. "Columbus," says Zacchias, "did not observe it in more than one or two instances; and Fallopius in not more than three females out of thousands whom he dissected."[*]

"Parè," says Mahon, "considers the presence of the hymen as contrary to nature; and states, that he searched for it in vain in females from three to twelve years of age."[†] Those, on the contrary, who, from dissection, have believed in its presence previous to sexual intercourse, or some other cause destroying it, are Fabricius, Albinus, Ruysch, Morgagni, Haller, Diemerbroek, Heister, Riolan, Sabatier, Cuvier, and I may add Denman. Haller appears to have observed it in persons of all ages.[‡] Cuvier has not only found it in females, but also in mammiferous animals; and thus gives strong evidence of its existence by analogy. Gavard, who appears to have dissected a great number of subjects at the *Hospital de la Salpetrière*, and also at the dissecting-room of Desault, states that he constantly found this membrane in the fœtus, and in children newly born. In others of a more advanced age he also observed it; and in particular in a female fifty years old, whom he was called to sound, he found it untouched; so also, in another, whom he attended with Prof. Dubois.*

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[*] Zacchias, vol. 1, 376.

[†] Mahon, vol. 1, p. 118.

[‡] "Ego quidem in omnibus virginibus reperi, quarum aliquæ adultæ erant ætatis, neque unquam desideravi, neque credo a pura virgine abesse. Vidi hymenem bis in fœtu, sexies in recens nata, bis in puella aliquot septimanarum, ter in annua, semel mense 18, semel in bimula, bis in sexenni, semel in decenni, semel in 14 annorum puella, semel in alia 17 annorum, semel in vetula." *Elementa Physiologiæ*, tom. 7, pars 2, p. 96 and 97. Some satirical remarks by Michaelis, on the German anatomists finding this membrane, and the French denying its existence, may be found in his Commentaries, vol. 1, p. 482. He quotes also the opinion of Roederer and Wrisberg in favour of its presence, and also of its being a sign of virginity.

The weight of testimony is thus evidently in favor of the affirmative of this question; and the general sense of the profession is certainly decidedly opposed to considering it as a non-natural appearance. The following circumstances, however, required to be noted, before we form an opinion concerning it as a sign of virginity. *It may be wanting from original mal-conformation, or it may be destroyed by disease or some other cause, and yet the female be pure.* Thus the first menstrual flux, if the aperture be small, may destroy it—or an accident, as a fall—or disease, as for example, an ulcer, may totally obliterate it. There have certainly occurred instances where the pressure of the confined menstrual fluid has produced its destruction. Again, in the place of the hymen, are sometimes found the *carunculæ myrtiformes.* Tolberg, according to Foderè, and also Belloc, have made this observation on dissection. They were, however, round, and without a cicatrix, and in this respect very distinct from the organs usually so termed.† *This membrane may, on the other hand, be present, and yet the female be unchaste; nay, she may become pregnant without having it destroyed.* Zacchias remarks, that it will not be ruptured when it is thick and hard. A disproportion between the organs, or connection during the presence of menstruation, or fluor albus, are also mentioned by him. Gavard, whom I have already mentioned, found it perfect in a female thirteen years of age, who was labouring under the venereal.‡

In those cases where this membrane is found thickened, an operation has often been necessary. Parè relates of a mother who applied to him to examine it; and, on dividing it, it was seen to be of the thickness of parchment.§ A similar case happened to Ruysch, of a female during labour, in whom he had not only to divide the hymen, but also another non-natural membrane placed farther back. Immediately after the operation, the child was born.‖ Baudelocque, Mariceau, Denman, and other writers on midwifery adduce many instances, illustrating the same fact.¶

These observations certainly lead us to doubt whether the presence or absence of the hymen deserves much attention; and I believe the opinion of physiologists generally is, that it is an extremely equivocal sign. I am, however, unwilling to go as far as most of the later writers on legal medicine, who virtually reject it altogether. While it must be allowed that it can be destroyed by causes which do not impair the chastity of the female, we are justified, I think, in attaching considerable importance to its presence. It would be difficult to support an accusation of rape, where the hymen is found entire.[*] Nor is the opinion so much at variance with the facts already stated, as may at first view be supposed. The case quoted from Gavard is a solitary one; and the numerous instances mentioned by writers on midwifery, where operations were required previous to delivery, certainly show a state of the hymen very different from its ordinary appearance and texture. I feel, therefore, justified in retaining it among the signs of virginity, although it should always be considered in connection with other physical proofs.

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* Foderè, vol. 4, 339.

† Foderè, vol. 4, p. 343. Belloc. p. 45. ‡ Foderè, vol. 4, p. 340.

§ Mahon, vol. 1, p. 118.

‖ Foderè, vol. 4, p. 430. See also vol. 1, p. 289, 390, for similar and even more extraordinary cases.

¶ Capuron states, that, a few years ago, he divided this membrane in a female during labour, and in a short period she was delivered of living twins. P. 32.

2. *Narrowness of the vagina.* In children, this part is extremely small; but it increases in size as they approach to the age of puberty. At that period, the developement produced by the determination of blood to the sexual organs, causes a turgescence and enlargement, which naturally place the parts in closer contact. In females, also, rugæ are observed on the inner surface of the vagina; and these are removed by frequent connections, and destroyed by one or two deliveries. It has been objected to this as a sign, that it varies according to the age of the individual, the temperament, and the state of health. Some of these deserve attention. In individvals of a sanguine temperament, the parts will be most contracted; while, on the other hand, if fluor albus, chlorosis or menorrhagia, be present, there will be great dilatation.

3. I have already mentioned, that, in the place of the hymen, certain fleshy tubercles, termed *carunculæ myrtiformes,* have been observed by anatomists; and shall now add, that a variety in their appearance has been considered indicative of chastity or unchastity. Zacchias remarks, that in the former they are red, tumid, and connected together by fleshy cords; but in married women (being situated at the entrance of the vagina) they are found pale, flaccid, and the cords torn asunder.[†] They are, however, generally considered as the remains of the hymen, "*et corruptæ adeo pudicitiæ indicia.*"[‡] They are then found thick, red, and obtuse at their extremities, somewhat resembling

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[*] Smith, p. 397. A case is however given in East's Crown Law, (1, 438) where two surgeons swore that the hymen was entire. "But as this membrane was admitted to be in some subjects an inch, in others, an inch and an half, beyond the orifice of the vagina, Ashurst J. left it to the jury, whether any penetration was proved, *for if there were any, however small,* the rape was complete in law. The jury found the prisoner guilty. In this case, the female was ten years of age, and the parts were stated to be so narrow, that a finger could not be introduced. This decision is much at variance with the evidence at present required in such cases in England. See the concluding part of the 3d section of this chapter.

[†] Zacchias, vol. 1, p. 378.

[‡] Dr. Conquest, I observe, contradicts this opinion, and remarks that the corunculæ may be found when the hymen remains entire. *Outlines of Midwifery,* p. 17. The assertion in the text is, however, in conformity to the general belief of writers on obstetrics.

a myrtle-berry; and from this supposition their name is derived. They generally disappear after frequent connections or deliveries.

In addition to the above, various signs have been enumerated by authors. These I will barely state, and refer the inquirer for more minute details to works on anatomy and midwifery. Pain during the first connexion, is deemed a proof; although the presence of menstruation or of disease may prevent this in many cases: so also blood from the rupture of the hymen.* The red and tumid appearance of the labia and nymphæ, and the rupture of the fourchette, are each extremely uncertain signs, since the latter does not generally occur until delivery, and the former may be present in the unchaste.

It should be observed, with respect to the signs last enumerated, that although they may be present notwithstanding the unchastity of the female, yet their absence is a proof against her. If the labia and nymphæ have the appearance which indicates previous connection; if the fourchette be ruptured, and the fossa navicularis obliterated, the only deduction we can draw must be an unfavourable one. Capuron, a disbeliever in the physical signs indeed, suggests, that a foreign body, such as a pessary, introduced with too much violence into the vagina, may have ruptured the fourchette; or the menstrual fluid, by becoming acrimonious, may have eroded it.† Both these suggestions are, however, equally improbable, and deserve little attention in forming a general rule.

Systematic writers have added to these, other signs, but they are generally equivocal. The bright red colour of the nipples, the hardness of the breasts, and, in fine, the general appearance of the female, all deserve attention, but can seldom be of any practical utility in determining on the point under examination.

From the above statement, an opinion may be formed concerning the dependence that is to be placed on the physical signs of virginity. It is not to be denied, that many may be equivocal; but, notwithstanding, it is the duty of the medical examiner to notice them, and that, *in connexion with one another.* It cannot be possible that all those which we have mentioned as present during the chaste state, can be wanting, without justifying a strong suspicion against the female. Midwives should always be associated with physicians in such cases; and they would be the proper examiners, provided their information and knowledge of the system were sufficiently extensive. It is also necessary to recollect, that these appearances are most striking in females of a tender age; and, as a general rule, guided however by the climate and the habit of body, they are found most perfect in females not farther advanced in life than twenty or twenty-five years of age.‡

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* This is indicated in the Jewish law. The curious will find some extraordinary discussion on this point in Zacchias, vol. 1, p. 376, and Michaelis, vol. 4, p. 192 to 199.

† Capuron, p. 29.

‡ The following remark of Foderé on this subject, deserves quotation.—

II. *Of the signs of defloration and rape.*

The marks of defloration, *i. e.* of connection without violence, are of course the reverse of those which we have stated in the preceding section. It is not necessary to recapitulate them in this place; but it is proper to observe, that they will most readily be seen, if the examination be made within a very short period after the event complained of: and again, the most striking proofs will occur where it has been the first connexion on the part of the female. Here the parts are generally found bloody, inflamed, and painful. Marks of a rupture of the hymen, or a disunion of the carunculæ, will also be present, together with an extreme sensiblity to the touch, a sensation of heat, and a difficulty in walking. In married women, or libidinous females, the detection is more difficult, and, in truth, in a great degree impossible, and that whether they accuse or are accused. The reasons for this will readily suggest themselves.

By the term *rape*, however, is understood not only defloration, but a commission of it against the will of the female; and again, the commission of this violence against a person of a tender age, who has as yet, in the legal sense of the term, no will. Here not only the signs of defloration already enumerated will be present, but also others indicative of the employment of force, such as contusions on various parts of the extremities and body. These, however, are compatible with final consent on the part of the female.

It also deserves attention, that disease has produced the appearance of external injury, and led to suspicions against innocent persons. Dr. Percival relates a case of serious importance in medico-legal investigations. Jane Hampson, aged four, was admitted an out-patient of the Manchester Infirmary, Feb. 11, 1791. The female organs were highly inflamed, sore, and painful; and it was stated by the mother, that the child had been as well as usual, till the preceding day, when she complained of pain in making water. This induced the mother to examine the parts affected, when she was surprised to find the appearances above described. The child had slept two or three nights in the same bed with a boy fourteen years old, and had complained of being very much hurt by him during the night. Leeches and other external applications, together with appropriate internal remedies, were prescribed; but the debility increased, and on the 20th of February the child died. The coroner's inquest was taken; previous to which, the body was inspected, and the abdominal and thoracic viscera found free of disease. From these circumstances, Mr. Ward, the surgeon attending this case, was induced to give it as his

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"Having often been engaged in such examinations, and finding the above-named physical signs of virginity wanting, I have declared the female unchaste; and the pangs of child-birth have in a few months confirmed my decisions, although they were considered harsh at the time." (Vol. 4, p. 352.) We must, however, add, that the faculty of medicine at Leipsic declared, that there does not exist any true and certain sign of virginity, (Metzger—notes, p. 483,) and Morgagni is of a similar opinion. (Opuscula Miscellanea, p. 37.)

opinion, that the child's death was caused by external violence; and a verdict of murder was accordingly returned against the boy with whom she had slept. Not many weeks elapsed, however, before several similar cases occurred, in which there was no reason to suspect that external violence had been offered, and some in which it was absolutely certain that no such injury could have taken place. A few of these patients died. Mr. Ward was now convinced that he was under a mistake in attributing the death of Jane Hampson to external violence, and informed the coroner of the reasons which induced this change of opinion. Accordingly, when the boy was called to the bar at Lancaster, the judge informed the jury, that the evidence adduced was not sufficient to convict; and that it would give rise to much indelicate discussion, if they proceeded to the trial; and that he hoped, therefore, they would acquit him, without calling witnesses. With this request the jury immediately complied. The disorder in these cases, says Dr. Percival, had been a typhus fever, accompanied with a mortification of the pudenda.*

A complaint, resembling the above in many respects, has also been lately described by Mr. Kinder Wood. It is preceded by all the ordinary symptoms of fever for about three days. The patients then call the attention of parents to the seat of the disease, by complaints in voiding urine, &c. When the genital organs are examined, one or both labia are found enlarged and inflamed. The inflammation is of a dark tint, and soon extends internally over the clitoris, nymphæ, and hymen. Ulceration succeeds, and the external organs of generation are progressively destroyed. This affection has proved very fatal, and seems to constitute a peculiar kind of eruptive fever.†

It is of great importance that the physician understand the possibility of such diseases occurring; "but we must take care not to run into the opposite error of ascribing inflammation, ulceration, and discharge, in cases where violence has been alleged, to this disease, without sufficient grounds; *for it is extremely improbable that diseases which occur so rarely, should happen to appear in a child to whom violence was offered, unless that violence had some effect in producing it.*"‡

Marks of external injury are hence to be considered as *corroborating*, but not as *certain* proofs of the commission of a rape. The weight which they deserve depends on several circumstances, which it is proper to notice.

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* Medical Ethics, p. 103 and 231. Capuron relates two cases of children, the one aged four and the other six years, both of whom were affected with a white and very acrid discharge from the vagina, accompanied with swelling of the external parts, severe pain, and indeed ulceration. A high fever was also present. In one instance, the parents loudly declared that violence must have been used towards their child. Professor Capuron, however, ascribed both to an epidemic catarral affection then prevalent in Paris, and considered the local complaint as entirely dependant on it. By the use of proper regimen, they readily recovered. Pages 41 and 42.

† Medico-Chirurgical Transactions, vol. 7, p. 84. Out of twelve cases seen by Mr. Wood, only two appear to have recovered.

‡ Edin. Med. and Surg. Journal, vol. 12, p. 491.

1. *The age, strength, and state of mind of the respective parties.* However we may doubt whether a rape can be committed on a grown female, in good health and strength, (and this point I shall presently notice,) yet there can be no question but that it can be perpetrated on children of a tender age. Previous to the age of sixteen, or rather before the period of menstruation, the female is not only deficient in strength, but is also ignorant of the consequences of the act: and fear may induce her to consent to libidinous desire. Again, should a female accuse a man who is cachectic, or a valetudinarian, little credit is to be given to her charges; as the respective strength of the parties will show the improbability of the commission of the act. For a similar reason, the probability is increased when the accused is vigorous and the accuser infirm; and, above all, should the female labour under imbecility of mind to such a degree as to render her incapable of judging concerning the morality of her actions, her age ought not to be taken into account. An individual of this description at twenty-five, is less capable of resistance than another of sound mind and body at fourteen. We must also add, that all accusations against persons aged above sixty years of age, should, as a general rule, be rejected; and if maintained, the accuser should prove the presence of greater strength and virility than is the ordinary lot of that period of life.

2. A comparison of the sexual organs may be necessary; since cases have occurred in which the male has proved impotency or defective organization, or has exhibited proofs of the destruction of parts by the venereal disease. In the female, however, it must be remembered, that it will be difficult to find the physical marks of rape, provided she is subject to the diseases formerly enumerated, or has had several children. In opposite cases, severe marks of the violence will be more evident; and these have sometimes been of the most striking kind, inducing, in one instance, according to Teichmeyer, great inflammation, and an incurable paralysis of the lower extremities.*

3. A speedy examination of the parts is all important in disputed cases. The body of the male should also be inspected, whether there be scratches or bruises on it.

I have intimated, that doubts exist whether a rape can be consummated on a grown female in good health and strength. It has been anxiously inquired, whether this violence, if properly resisted, (and this is included in the very definition of rape,) can be completed? And in the consideration of this, it is needless to observe, that those cases, in which insensibility by violence or soporifics has been previously produced, or where many are engaged against one female, are of course excluded. Some hesitation is doubtless proper in deciding on a question of this magnitude; but I confess that I am strongly inclined to doubt its probability. The opinion of medical jurists generally is very decisive against it. " En un mot," says Mahon, " d'après la connaissance physique que les medicins ont de l'homme et de la femme, relativement a cet attrait imperieux qui porte invinciblement les deux sexes, l'un vers l'autre, d'après surtout l'impossibilité presqu' entiere ou est un homme seul de forcer une femme à recevoir ses caresses, on doit rarement ajouter foi a l'existence du *viol*; je crois même qu'il seroit prudent de ne l'admettre que lorsque plusieurs hommes armés se sont rèunis pour commettre ce crime."[*] "An attempt," says Farr, "under which is to be understood, a great force exercised over a woman to violate her chastity, but where a complere coition is prevented, may be possible. But the *consummation* of a rape, by which is meant a complete, full, and entire coition, which is made without any consent or permission of the woman, seems to be impossible, unless some very extraordinary circumstances occur. For a woman always possesses sufficient power, by drawing back her limbs, and by the force of her hands, to prevent the insertion of the penis, whilst she can keep her resolution entire."[†] "Independamment de l'arme que la loi met dans la main de la femme pour repousser l'injure, elle a infiniment plus des moyens pour se defendre que l'homme n'en a pour attaquer, ne fut ce que le mouvement continuel." And again, "l'estime qu' une personne du sexe, qui a atteint l'age de dix-huit à vingt ans, ne peut plus etre prise par force par un homme seul, quel qu'il soit, a moins de la menace d'une arme meurtrière, et que le crainte de la mort ne soit plus forte que celle de perdre l'honneur."[‡] Metzger only allows of three cases in which the crime can be consummated—where narcotics have been administered—where many are engaged against the female—and where a strong man attacks one who is not arrived to the age of puberty."[§] If to these we add the commission of previous violence, so as to disable the female, or extreme disproportion in strength, the exceptions will probably be sufficiently numerous.[‖]

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* MS. Notes of Stringham's Lectures.

Cases in which false accusations of rape have been made against individuals, are scattered through most of the works on medical jurisprudence.[¶] I shall quote one, both from its having happened not long since; and also as it shows the course pursued in such instances in France. A female at Martigues, in 1808, accused eight or ten of the principal persons in the place, of having violated her grand-daughter, aged about nine years and an half, at an inn. She laid her complaint before the justice, (juge de paix;) but stated that she would withdraw it, provided the accused would accommodate the matter with her. She had procured a daughter of the innkeeper, aged sixteen, and an idiot, as a witness. As the charge was obstinately persisted in, Foderè, with two officers of health, was ordered to examine the child in the presence of the judge; and suspicion was immediately excited, from the delay used in admitting the visitors. On examining the parts, he found the hymen untouched, and the vagina extremely narrow. Around the pudenda, however, a red circle, about the size of a crown, was observed, which appeared to have been induced recently; and this was indeed the fact; for at the end of half an hour, the circle had decreased in size, and the redness disappeared. Had this been the effect of great violence, it is natural to suppose that it would have increased in intensity of colour. A report was prepared, stating the above facts; and the consequence was, that the accuser was put in prison, and finally ordered out of the city.[*]

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[*] Mahon, 1. 186.

[†] Farr, p. 41 and 42.

[‡] Foderè, 4. p. 359, 360. Capuron advances the same opinion, p. 54; and Brendelius, p. 96.

[§] Metzger, p. 255.

[‖] I must add to the above the following answer, given by the medical faculty of Leipsic, to the question, whether a single man could ravish a woman. "Si circumstantias quæ in actu coeundi concurrunt, consideramus, non credibile, nec possibile videtur, quod unus masculus nubilem virginem (excipe impubem, teneram, delicatam, aut simul ebriam puellam) absque ipsius consensu, permissione, atque voluntate vitiare, aut violento modo stuprare possit; dum fœmina cuilibet facilius est, si velit, penis immissionem recusare, vel multis aliis modis impedire, quam viro eidem invitæ planè intrudent."—Valentini Pandectæ, vol. 1, p. 61.

[¶] See the case of one *Stephen Nocetti*, which was referred to Zacchias, and where there was an actual deficiency of parts. The accusation was made four months after the supposed commission of the crime. (Consilia, No. 84, vol. 3, p. 63.)—Also the case of *Erminio*. (Consilia, No. 41, vol. 3, p. 74.—Foderè also quotes a case from Devaux, where there was nothing but a slight excoriation of the parts; and of course it was decided that there were no evidences of a rape having been committed. (4. 371.)—I will only add a caution, not to mistake menstruation for the effects of defloration.

Instances sometimes occur, in which death has followed the consummation of a rape, from the violence employed. Here, if the physician be called on to examine the body, he should particularly notice the condition of the sexual organs, both internal and external; and also ascertain whether no proofs are present, from which the exertion of violence may be presumed, such as the introduction of substances into the mouth to prevent crying out, contusions, or dislocation or fracture of the extremities. He should notice whether the labia are dilated and flaccid, the state of the hymen, clitoris, nymphæ, and vagina generally, and also whether the fourchette is ruptured. The fluid, (if any be present) contained in the vagina, should be examined, whether sanguineous, mucous or purulent, and the presence or absence of tumefaction and extraordinary dilatation, should be remarked.[†]

III. *The laws of various countries concerning this crime.*

There are two reflections which are of deep weight in all our investigations on this subject, and which should particularly be kept in mind when noticing the laws concerning it. The nature of the crime, being an offence against the weaker sex, and committed in secrecy. Being of so detestable a character, and so difficult to be proved, the law has wisely ordained that the testimony of the injured person shall be sufficient, unless impeached, to convict the criminal. But again, and this is the second remark, false accusations are frequently made for the gratification of malice and revenge. The scriptures, and the records of courts in all countries, bear testimony to this.* In this point of view, the medical jurist may often aid the ends of justice in punishing the wicked, and absolving the innocent.†

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[*] Foderè, vol. 2, p. 456; and vol. 4, p. 371. The distinction made in Deuteronomy, chap. 22, between the commission of the crime *in the city* or *in the field*, deserves attention in the consideration of this point.

[†] Foderè, 4, 372.

I have thought that a sketch of the laws of various countries concerning this crime might prove interesting, and in some degree useful. The materials for this purpose have been collected in a great measure by Blackstone and Percival, and I have added to these, the laws existing in various states throughout the union. I shall notice, separately, the laws respecting the commission of the crime, on the female of tender age, and on the female who has arrived at maturity.

1. As this crime can be committed with the greatest facility on children under the age of puberty, in consequence of their want of strength, but particularly from their ignorance of the consequences of the act, the law has wisely directed that the consent or non-consent of the female under age is immaterial, "as, by reason of her tender age, she is incapable of judgment and discretion."

In the 3d year of Edward I. by the statute, Westminster, the offence of ravishing a damsel within age, (that is, *twelve* years old,) either with her consent or without, was reduced to a trespass, if not prosecuted by appeal within forty days, and the offender was subjected to two years' imprisonment, and a fine at the king's will. This lenity, however, was in a short time found very injurious; and, by statute 18 Elizabeth, chap. 7, carnally knowing and abusing a child under the age of *ten* years, was made felony, without benefit of clergy. Sir Matthew Hale, says Blackstone, is indeed of opinion, that such actions committed on an infant under the age of *twelve* years, the age of female discretion by the common law, either with or without consent, amount to rape and felony, as well since as before the statute of Queen Elizabeth; but that law, he adds, has in general been held only to extend to infants under *ten*.‡

The French code of 1810 ordains, that if the crime has been committed on a child under the age of *fifteen* years, the offender shall be condemned to hard labour for a limited time, (travaux forcés a temps.)§

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* On the trial of Levi Weeks, for the murder of Miss Sands, held at New-York, March, 1800, the counsel for the prisoner stated, that "in that very city, a young man, not many years ago, had been charged with the crime of rape. The public mind was highly incensed; and even after the unfortunate man had been acquitted by the verdict of a jury, so irritated and inflamed were the people, that the magistrates were insulted, and they threatened to pull down the house of the prisoner's counsel. After that, a civil suit was instituted for the injury done the girl, a very enormous sum given in damages, and the defendant was ignominiously confined within the walls of a prison. Now it has come out, that the accusation was certainly false and malicious."—Report of the Trial, &c. p. 67.

† "A man named Stewart was tried at the Old Bailey in 1704, for ravishing two female children. The evidence being at variance as to the fact of penetration, the children were sent out of court to be examined, and the eldest was found to have the signs of virginity."—Smith, p. 397.

‡ Blackstone's Commentaries, vol. 4, p. 212.

§ Foderè, vol. 4, p. 329. Capuron, p. 1. They quote the Code Penal, Art. 332.

In our own state, the statute of the 18th of Elizabeth appears to have been copied. By an act passed Feb. 14, 1787, it was ordained, that if any person should unlawfully or carnally know a woman child under ten years of age, such unlawful or carnal knowledge should be adjudged a felony, and the criminal should suffer death.* But, by an act passed March 21, 1810, the above punishment is changed to that of imprisonment in the state prison for life. In Massachusetts and Illinois, death is the punishment.† In Virginia, New-Hampshire, Connecticut, and New Jersey, imprisonment either for life, or a long term of years, is directed.‡ All these specify the period of *ten* years. The law in Vermont varies from this. It directs, that whenever any individual over the age of fifteen shall abuse any female under *eleven*, with or without her will, he shall suffer fine and imprisonment.§

A few remarks are here necessary as to the credibility of witnesses in these cases. "If a rape," says Blackstone, "be committed on an infant under twelve years of age, she may still be a competent witness, if she hath sense and understanding to know the obligation of an oath, or even to be sensible of the wickedness of telling a deliberate lie. Nay, though she hath not, it is thought by Sir Matthew Hale, that she ought to be heard without oath, to give the court information; and others have held, that what the child told her mother, or other relatives, may be given in evidence, since the nature of the case admits frequently of no better proof.‖ But it is now settled, he adds, (Brazier's case before the twelve judges, 19 George III.) that no hearsay evidence can be given of the declaration of a child, who hath not a capacity to be sworn, nor can such child be examined in court without oath; and that there is no determinate age, at which the oath of the child ought either to be admitted or rejected.¶ "Yet," he adds, "where the evidence of children is admitted, it is much to be wished, in order to render their testimony credible, that there should be some concurrent testimony of time, place, and circumstances, in order to make out the fact, and that the conviction should not be grounded singly on the unsupported accusation of an infant under years of discretion."[*]

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* Jones and Varick's edition of the Laws of New-York, vol. 2, p. 47.

† General Laws of Massachusetts, Boston, 1807, vol. 3, p. 340. Laws of Illinois, passed in the session of 1819, p. 219.

‡ Revised Laws of Virginia, Richmond, 1803, vol. 1, p. 356. Laws of New-Hampshire, Concord, 1812, p. 7. Revised Laws of Connecticut, Hartford, 1821, p. 152. Revised Laws of New-Jersey, Trenton, 1821, p. 246.

§ Laws of Vermont, Rutland, 1798, p. 159.

‖ Formerly it was the practice in the English courts to refuse the evidence of children. See the King *v* Travers, in 1st Strange, p. 700. Lord Chief Baron Gilbert, and Chief Justice Raymond, at two different trials, refused the evidence of the injured child, who was six years old, and the man was acquitted for the want of evidence.

¶ The case above-mentioned was as follows: One Brazier was indicted at the assizes for York, for a rape on an infant seven years of age. The information of the infant was received in evidence against the prisoner; but as she had not attained the years of presumed discretion, and did not appear to possess sufficient understanding to be aware of the danger of perjury, she was not sworn. The prisoner was convicted; but the judgment was respited, on a doubt whether evidence, under any circumstances whatever, could be legally admitted in a criminal prosecution, except upon oath. Mr. Justice Gould, accordingly, reserved this point for the opinion of the twelve judges; and they unanimously agreed, "that no testimony

2. I shall now proceed to give an enumeration of the laws of various countries against the crime of rape, arranged, as much as possible, in chronological order. "If a man," says the Jewish law, "find a betrothed damsel in the field, and the man force her and lie with her, then the man only that lay with her shall die. But unto the damsel thou shalt do nothing—for he found her in the field, and the betrothed damsel cried, and there was none to save her."[†] In case the female was not betrothed, then a fine of fifty shekels was to be paid to her father, and she was to be the wife of the ravisher, without permitting him the power of divorce. Among the Athenians, rape was punished with death, and by the Roman or civil law, with death and confiscation of goods.[‡] The latter, however, ordained, "*Rapta raptoris, aut mortem, aut indotatas nuptias optet,*" and upon this, says Dr. Percival, there arose what was thought a doubtful case. "*Una nocte quidam duas rapuit, altera mortem optat, altera nuptias.*"[§] The Roman law also would not receive the complaint of a prostitute.[||]

Charlemagne punished with death, whoever violated the daughter of his master.[¶] The Burgundian laws provided, that if the young

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can be received legally, except upon oath; and that an infant, though under the age of seven years, may be sworn in a criminal prosecution, provided such infant appears, on strict examination by the court, to possess sufficient knowledge of the nature and consequences of an oath; for there is no precise or fixed rule as to the time within which infants are excluded from giving evidence; but their admissibility depends upon the sense and reason they entertain of the danger and impiety of falsehood, which is to be collected from their answers to questions propounded to them by the court; but if they are found incompetent, their testimony cannot be received."—East's Crown Law, 1, p. 144.

[*] Blackstone, 4, p. 214.

[†] Deuteronomy xxii. 25. Michaelis, however, contends, that for rape, *as rape*, no punishment is appointed by the Mosaic law; and he explains the above passage by considering it only as rape *committed on a bride.* In either case, whether in the city (verse 23) or in the field, the perpetrator was to be punished—but not if the female was not betrothed. Our author proposes several reasons for this omission, and amongst others, the debasement which polygamy produces in the female sex, and the law, that whoever debauched a damsel, should marry her. This last he deems a more effectual preventative of rape, than capital punishment. Michaelis' Commentaries, 4. p. 169 to 174.

[‡] Gibbon, 2, p. 252. Law of Constantine.

[§] Medical Ethics, Note 17, p. 231.

[||] Foderè, 4, p. 325.

[¶] "Si quis filiam domini sui rapuerit, morte moriatur." See Memoirs of Literature, 6, p. 103. "A notice of the Monumenta Paderbornensia, to which is added the capitulary of Charlemagne, from a very ancient Palatine manuscript in the Vatican, published in 1718." Hallam also mentions, that under the feudal system it was considered a breach of faith in the vassal, to violate the sanctity of his master's roof. In the Establishments of St. Louis, chap. 51, 52, it is said, that a lord woman carried off, returned to her parents actually corrupted, the offender should pay six times her price or legal valuation, and also a mulct of twelve shillings. If he had not wherewithal to pay these sums, he should be given up to her parents, or near relatives, to take their revenge on him in what way they pleased. By the Welsh laws of Prince Hoel Dha, if two women were walking together without other company, and violence was offered to either or both of them, it was not punishable as a rape; but if they have a third person with them, they might claim their full legal redress. If the perpetrator of a rape, being accused, confessed the fact, besides full satisfaction to the woman, he was to answer for the crime to his sovereign, by the present of a silver stand as high as the king's mouth, and as thick as his middle finger, with a gold cup upon it, so large as to contain what he could take off at one draught, and as thick as the nail of a country fellow who had worked at the plough seven years. If the offender was not able to make such a present, *virilia membra amittat.* By the law of Æthelbert, the first Christian king of Kent, it was enacted, that if any person takes a young woman by force, he shall pay her parent or guardian fifty shillings, and shall make a further compensation for her ransom. If she were espoused, he shall compensate the husband by an additional payment of twenty shillings. But if she were with child, the augmented fine shall be five and thirty shillings, and fifteen more to the king. There is also an ordinance of Alfred in existence, for the punishment of rapes committed on country wenches, who were servants; an offence, (says Dr. Percival,) which may be supposed to have been prevalent at that time.* Rape, however, by the Saxon laws, particularly those of King Athelstan, was punished with death, which was also agreeable to the old Gothic or Scandinavian constitutions. Besides this, the horse, greyhound, and hawk of the offender were subjected to great corporal infamy. Instead of this, a new punishment was inflicted by William the Conqueror, who probably brought the custom from Normandy, viz. castration and loss of eyes. During the period that this was in force, the woman, who was the sufferer, might (by consent of the judge and her parents,) redeem the criminal from all the penalties, if, before judgment, she demanded him for her husband, and he also was willing to agree to this exchange. This law of William continued in force in the reign of Henry the Third; but, in order to prevent malicious accusations, it was then law, (and it seems still continues to be so in appeals of rape,) says Blackstone, that the woman should immediately after, "*dum recens fuerit maleficium,*" go to the next town,

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seducing his vassal's daughter, entrusted to his custody, lost his seignory; and a vassal guilty of the same crime towards the family of his suzerain, forfeited his land. Hallam's Middle Ages, vol. 1, p. 187. Amer. ed.

* It is as follows; "Si quis coloni mancipium ad stuprum comminetur, 5 sol. Colono emendet et 60 sol; mulctæ loco. Si servus servam ad stuprum coegerit, compenset hoc virgà suâ virili. Si quis puellam teneræ ætatis ad illicitum concubitum comminetur, eodem modo puniatur quo ille, qui adultæ servæ hoc fecerit."—Percival, p. 288.

and there make discovery to some credible persons of the injury she has suffered, and afterwards should acquaint the high-constable of the hundred, the coroners and the sheriff, of the outrage. This seems to correspond, in some degree, with the laws of Scotland and Arragon, which require, that complaint must be made within twenty-four hours; though afterwards by statute Westm. the time of limitation was extended to forty days. This statute, passed in the 3d of Edward I. repealed the law of the Conqueror, and greatly mitigated the punishment. The offence of ravishing a woman against her will, was reduced to a trespass, if not prosecuted by appeal within forty days, and it subjected the offender only to two years' imprisonment, and a fine at the king's will. But this lenity was found productive of the most terrible consequences, and in ten years after, 13th Edward I. it was found necessary to make the offence of forcible rape felony by statute.[*]

The constitution of Charles the Fifth enacted the punishment of death for rape, and the edict of Francis the First, preserved by Coquille, together with the ordinances of Orleans and Blois, forbid the asking of pardon for this crime. Henry the Second of France, by an ordinance of 1557, condemned those who had forced a woman or a girl, to be hung. Such was also the edict of Louis XV. in 1730, and such are the laws of various states in Italy. The ancient parliaments of France, during the 16th and 17th centuries, enforced the law with great severity on those accused of the crime.[†]

The above gleanings will elucidate, in some degree, the laws of former times concerning this crime. I now proceed to mention those which are, or lately have been, in force. The following maxims, says Foderè, (which he quotes from Boerius,) have been adopted for thirty years in Neapolitan jurisprudence, viz. that in accusations for rape, there be full proof of the following facts: 1. That there has been a constant and equal resistance on the part of the person violated. 2. That there is an evident inequality of strength between the parties. 3. That she has raised cries; and 4. That there be some marks of violence present. The French code of 1791, ordained that a simple rape should be punished with six years' confinement in irons; but if the rape be committed on a child under fourteen years, or if the criminal had effected the crime by violence, or by the aid of accomplices, the punishment should be twelve years' confinement in irons. The law of 2d Prairial, l'an 4, (1796) prescribed the same punishment for an attempt, if accompanied by violence. All these ordinances were, however, annulled by the Napoleon code, which prescribes imprisonment for the crime, if consummated or attempted with violence. If, however, the criminal has any authority over the person injured, such as a guardian or a teacher, if he be a servant, public functionary;

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[*] Blackstone, vol. 4, p. 210, 211. Percival, p. 100; and Note 17. p. 228. Chitty's Criminal Law, 2, p. 813.

[†] Foderè, 4, p. 326. "Among the familiar customs of the *Isle of Man*, are the following: If a man ravish a wife, he must die—if a maid, the deempsters (the

or clergyman; and, finally, if the individual, whoever he be, is aided by one or more persons, the punishment shall be imprisonment for life.*

In Scotland, the ravisher is exempted from the pains of death, only in case of the woman's subsequent consent, or her declaration, that she went off with him of her own free-will; and even then he is to suffer an arbitrary punishment, either by imprisonment, confiscation of goods, or a pecuniary fine.†

The law at present in force in England, is the statute 18th Elizabeth, chap. 7, in which rape is made felony, without benefit of clergy. It is a necessary ingredient in the English law, that the crime should be against the woman's will, and, in this, it differs from the Roman, which prescribed the same punishment, whether the female consented or not. The civil law, also, (as we have already stated) does not seem to suppose a prostitute capable of any injuries of this kind, whilst the English law holds it felony to force even a concubine or harlot, because the woman may have forsaken that course of life. At present, also, no time of limitation for making complaint is fixed, but the jury will rarely give credit to a stale accusation. In addition to these, we may add, that the common law considers a male infant, under the age of fourteen, as incapable of committing a rape, and therefore cannot be found guilty of it. For though, (says Blackstone) in some felonies, *malitia supplet ætatem*, yet as to this particular species, the law supposes an imbecility of body as well as mind.‡

In the state of New-York, death was formerly the punishment for committing a rape on a married woman or a maid. (Act passed Feb. 14, 1787.)§ And it was also ordained at the same time, that if a woman had been ravished, and afterwards consented to her ravisher, her husband, father, or next of kin, might sue by appeal against such offender.‖ These laws, however, have been repealed, the punishment altered, and appeals of felony abolished. The acts now in force, prescribe the punishment of imprisonment for life in the state-prison, on the offender and his accomplices, if he have any, for ravishing by force any woman-child of the age of ten years or upwards, or any other woman. An assault, with an intent to commit a rape, may be punished by fine and imprisonment, or both.¶

In the states of Delaware, South-Carolina, Connecticut, Massa-

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judges) deliver to her a rope, a sword, and a ring; and she is then to have her choice, to hang, behead, or marry him." See a Review of a Tour through the Isle of Man, by David Robertson, Esq. London, 1793, in the British Critic, vol. 3, p. 408. In China, rape is punished with death. See Edinburgh Review, 16, p. 498. (Review of the Penal Code of China, translated by Sir George Staunton.)

* Fodéré, 4, p. 328, 329. Code Penal, Art. 331, 332.

† Edin. Encyclop. vol. 11, p. 623. *Law of Scotland.*

‡ Blackstone, 4, chap. 15. sec. 3.

§ Jones and Varick's edition of the Laws, vol. 2, p. 57.

‖ Ibid. vol. 2, p. 57.

¶ Revised Laws, vol. 1, p. 150, 408, 409, 410, 500 chusetts, and Illinois, death is the prescribed punishment.[*] While in Pennsylvania, Virginia, Vermont, New-Hampshire, and New-Jersey, imprisonment for a long term of years, with or without fine, is directed.[†]

There is one point which deserves attention before I conclude the present section. Rape is the *carnal knowledge* of a female, forcibly and against her will. It has been a subject of some legal discussion, as to what constitutes this carnal knowledge. Some judges have supposed that penetration alone was sufficient, while others have contended that penetration and emission are both necessary. All seem agreed that the latter without the former will not suffice. The following abstract, taken from Chitty's Treatise on the Criminal Law, will give an idea of the fluctuating state of jurisprudence on this subject. "Lord Coke, in his reports, supposes both circumstances must concur. 12 Cok. 37, though he does not express himself so clearly in his institutes. Hawkins, without citing any authority, or hinting a doubt, declares the same opinion. Hale, however, differs from both, and considers the case in Coke's Reports as mistaken. In more modern times, prisoners have been repeatedly acquitted, in consequence of the want of proof of emission. In one instance, on the other hand, the prisoner was found guilty, under the direction of Justice Bathurst, who did not consider this fact as necessary to the consummation of the guilt. But in Hill's case, which was argued in 1781, a large majority of the judges decided that both circumstances were necessary, though Buller, Loughborough, and Heath, maintained a contrary opinion. This then," he adds, "seems to be the stronger opinion; and, at the present day, if no emission took place, it would be more safe to indict for an attempt to commit, by which means a severe punishment might be inflicted."[‡]

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[*] Laws of Delaware, Newcastle, 1797, vol. 1, p. 67. Public Laws of South-Carolina, edited by Judge Grimke, p. 30. Revised Laws of Connecticut, Hartford, 1821, p. 152. Laws of Massachusetts, Boston, 1807. vol. 3, p. 340. Laws of Illinois, passed in 1819, p. 219.—The laws of Virginia and Illinois contain some peculiarities which deserve mention. The former (vol. 1, p. 188,) declares, that "it shall not be lawful for any county or corporation court to order or direct the castration of any slave, except such slave shall be convicted of an attempt to ravish a white woman; in which case they may inflict such punishment." In Illinois, it is declared by statute, that so much of the law regulating the evidence in case of rape, as makes emission necessary, is hereby repealed; but it adds the following proviso, which I can hardly approve: "That the court before whom any offender may be brought for trial for said offence, shall have other satisfactory proof or evidence of violence on the person of the woman reported to have been ravished." In Missouri, I am informed, on good authority, that the punishment directed by law for rape, is castration by a skilful surgeon.

[†] Laws of Pennsylvania, Philadelphia, 1808, vol. 5, p. 2. Revised Laws of Virginia, Richmond, 1803, vol. 1, p. 356. Laws of Vermont, Rutland, 1798, p. 159 Laws of New-Hampshire, Concord, 1812, p. 7. Revised Laws of New-Jersey, Trenton, 1821, p. 246.

[‡] Chitty's Criminal Law, vol. 2, p. 810. This abstract is for the most part taken from East's Pleas of the Crown, (vol. 1, p. 437 to 440.) In this last a number of cases are given, which very strikingly prove the diversity of opinion that has existed amongst the English judges. The leading particulars in the case of Hill, cited above, are also stated; and the great majority of the judges that deemed both necessary to constitute the crime, seems to have settled the law in that country. A decision conformable to it was made by Baron Richards at the Northumberland assizes in

Although the definition of the crime seems thus to be settled, yet, if we proceed to notice the mode in which the emission is to be proved, we shall find some discordance. East observes, that penetration is *prima facie* evidence of it, unless the contrary appears probable from the circumstances; and adds, that Hawkins is expressed to that purpose. "So where, upon an indictment for an assault with an intent to ravish the prosecutrix, she swore that the defendant had had his will with her, and had remained on her body as long as he pleased, though she could not speak as to emission, Judge Buller said that this was a sufficient evidence to be left to a jury of an actual rape; and therefore ordered the defendant to be acquitted under the present charge. He said, that he recollected a case, where a man had been indicted for a rape, and the woman had sworn that she did not perceive any thing come from him; but she had had many children, and was never in her life sensible of emission from a man: and that was ruled not to invalidate the evidence which she gave of a rape having been committed on her."* Chitty observes, "It is certain that no direct evidence need be given to the emission; but that will be presumed on proof of penetration, until rebutted by the prisoner. And it will suffice to prove the least degree of penetration, so that it is not necessary that the marks of virginity should be taken from the sufferer."† So also Baron Richards, in the case cited below, although he deemed emission essential, and the woman was not sensible of it, yet he told the jury, that it was for them to deliberate whether, on a careful examination of all the

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1815; and, as the case is interesting, I shall detail its leading particulars. The prosecutrix was a married woman, apparently between thirty and forty years of age. The defendants were two brothers, by one of whom the act was alleged to have been perpetrated, while the other held the husband forcibly down at not more than two yards distance from the spot where his wife was said to have been violated. The woman swore positively to the penetration, but could not swear to the emission; and she assigned as a cause, the agitation and syncope which supervened during the struggle. She perfectly comprehended the import of the question put to her; and declared explicitly, that she had, on every previous coition with her husband, been sensible of the act of emission. Nor could she say that she was aware of any unusual humidity of the parts immediately after the commission of the crime. This she ascribed to having tumbled or waded through some water at the bottom of the dean where the assault took place. On both these points, Baron Richards laid great stress; and told the jury, that the fact of emission must be sworn to or proved, in order to constitute the crime of rape, according to the law of England. The evidence of the husband also went to prove, that the ravisher remained long enough on the body of the female to complete his purpose. The evidence for the prosecution, however, failed in credibility; as the prisoner's counsel, besides the above particulars, showed satisfactorily, that the man and his wife were at the time in a state of intoxication, sufficient to destroy the validity of what they had sworn to. The prisoners were accordingly found not guilty.—Edin. Med. and Surg. Journal, vol. 12, p. 207.

* East, 2, p. 440. This case was tried at the Winchester assizes, 1787.

† Chitty, 2, p. 812. I have already quoted the case (p. 76,) on which the latter part of this dictum is founded. This may probably be correct in children under ten years of age; but, in all others, it will be readily observed, that if it be allowed, all possibility of the female's proving the emission is in a great measure done away. Surely such instances are rather to be considered as *attempts to commit the crime*, than the *consummation of it*.

other collateral circumstances of the case, they had reason to be satisfied that this part of the crime, as well as every other, had been actually consummated.*

It may appear presumptuous in me to canvass the high authorities now cited; but it would certainly seem, that, on the one hand, a solemn decision has been made, recognizing emission as necessary to constitute the crime; while, on the other, penetration is considered as prima facie evidence of it; and that a jury, even if the former be not directly sworn to, are allowed to judge from all the circumstances presented to them, whether it did not occur. But even if it be consistent, I conceive that it is objectionable to insist on this proof.

If there be any truth in the views already intimating concerning the possibility of committing this crime, and the cases in which it may be completed, certainly the necessity of establishing the fact of emission must prove an insuperable barrier to any conviction. We may divide females, with reference to this subject, into two classes—the young, unmarried persons; and the married, or those accustomed to sexual intercourse. As to the first, it may be considered very improbable that they could be conscious of this, while labouring under the influence of terror, severe pain, faintness, or insensibility. And to this class also belong those of a very tender age, who are totally ignorant of the nature of the crime, and of what is necessary to complete it.

It is, however, urged, that there is great propriety in requiring this testimony from married females; and that if they are not sensible of that "which constitutes the very essence and climax of feeling," their declarations do not deserve much credit as to the other parts, in which a less degree of poignancy of sensation is requisite.† I confess, that language of this kind appears to me misapplied. If proper resistance be made, where the contest is solely between two individuals of strength in any degree proportionate, the crime can scarcely be completed without violent personal injury to the female. The exhaustion that must be present, superadded to mental agitation, leave us some reason to doubt whether this enjoyment can be realized. And it also deserves consideration, that if the resistance has been *complete throughout*, such pain may ensue from the repeated attempts to effect the crime, as to dull all sensation on this point. I forbear pressing the case mentioned by Judge Buller, although it is probably that other females, like the one mentioned by him, may not be sensible of it.‡

It may appear a rash conjecture, but I cannot forbear adding, that the apprehension of false accusations appears to have led to the investigation in question. Whether this would not be better obviated by inquiring more minutely into the degree of violence used, and ascertaining whether it would justify the submission of the female, is a point which I leave to those who are entrusted with the formation and administration of our laws. In our own state, I have understood, that indictments *for an attempt* have of late years been more in use than for the crime itself.*

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* Edin. Med. and Surg. Journal, 18, p. 208.

† Edin. Med. and Surg. Journal, vol. 18, p. 209.

‡ "Considering the nature of the crime, that it is a brutal and violent attack upon the honour and chastity of the weaker sex, it seems more natural and consonant to the sentiments of laudable indignation which induced our ancient lawgivers to rank this offence among felonies, if all further inquiry were unnecessary, after satisfactory proof of the violence having been perpetrated by actual penetration of the unhappy sufferer's body. *Upon what principle, and for what rational purpose, any further investigation came to be supposed necessary, the books which record the dicta to that effect do not furnish a trace.*"—East, 2, p. 436—437.

IV. *Of some Medico-Legal questions connected with this subject.*

Three questions relating to the subject before us, have at various times been discussed, and they all deserve a brief notice.

1. *Whether the presence of the venereal disease in the female violated; is a proof in favour or against her accusation?* If, on examination, the marks of this disease are found recent, it will be proper to consider them as corroborating circumstances. It is necessary, however, to remark, that the symptoms of venereal infection do not commonly make their appearance until three days after receiving it, while the examination should be made within that time. Should the appearances indicate any thing like a disease of long standing, they must of course tend to weaken the complaint of the female. The following is a case which will illustrate these observations. On the 11th of Dec. 1811, Foderé was directed, by the imperial attorney of the court of Trevoux, to visit a female aged from eleven to twelve years, who accused a man aged fifty, and of large stature, of having committed a rape on her. The crime she stated was consummated on the 26th of Nov. preceding. On examination, our author found that in this person the menses had not yet appeared, the nymphæ were inflamed, and the parts surrounding the meatus urinarius discharged an acrid gonorrhœal fluid, the hymen was ruptured, and the entrance of the vagina enlarged, but the fourchette was not ruptured, nor were there any signs of great violence, or such as might be expected from the disproportion between the individuals. Foderé reported that the venereal disease in this child was a proof of connection, but he did not consider it so of rape. Her conduct, he adds, was destitute of all modesty. The accusation was, however, persisted in; but, on the trial, it was proved that the parents had placed her with a woman who was a prostitute, and also that the child had never complained of violence, until after she discovered symptoms of the venereal. The prisoner was acquitted.†

2. *Can a female be violated during sleep, without her knowledge?* If the sleep has been caused by powerful narcotics, by intoxication, or syncope, or excessive fatigue be present, it is possible that this may

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* A case was tried, some years since, at the Albany circuit, by Mr. Justice Platt, in which he declared the law to be as laid down by the judges in Hill's case. Emission, however, is not considered essential in Pennsylvania, (according to Judge Cooper;) and properly, he adds, for it is not the essence of the crime, and it may happen without being perceived in cases of violence. (Cooper, p. 229.)—In Illinois, I have already stated, it is expressly enacted, "that so much of the law regulating the evidence in case of rape, as makes emission necessary, is hereby repealed." (Acts passed in 1819, p. 219.)

† Foderé, 4, p. 365—366.

occur, and it ought then to be considered, to all intents, a rape. In such cases, the quantity of stupifying drugs administered may be so great, as to render her unable, even if awakened by the violence, to withdraw from it. The proof of the crime is to be obtained from the injury sustained, from the symptoms attendant on the exhibition of narcotics, (if they have been given,) and which will be noticed under the head of Vegetable Poisons, and finally, (what may certainly happen) pregnancy occurring, and its term corresponding to the above æra. As to natural sleep, I totally disbelieve its possibility with a pure person. The medical faculty of Leipsic, however, in 1669, decided that it might be accomplished. I prefer, however, the opinion of the juridical faculty of Jena, who, in a similar case, only allowed the exceptions already stated.* As to females accustomed to sexual intercourse, it has been supposed practicable, but if we do agree to that opinion, the circumstances certainly should be very corroborative. Some degree of scepticism may, I think, be permitted concerning it.†

3. *Does pregnancy ever follow rape?* On this question a great diversity of opinion has existed. It was formerly supposed that a certain degree of enjoyment was necessary in order to cause conception, and accordingly the presence of pregnancy was deemed to exclude the idea of a rape. Late writers, however, urge that the functions of the uterine system are in a great degree independent of the will, and that there may be *physical constraint* on those organs, sufficient to induce the required state, although the will itself is not consenting. We do not know, nor shall probably ever know, what is necessary to cause conception; but if we reason from analogy, we shall certainly find cases where females have conceived while under the influence of narcotics, of intoxication, and even of asphyxia, and consequently without knowing or partaking of the enjoyment that is insisted on. I should, therefore, consider that pregnancy was not incompatible with the idea of rape, under the limitations already laid down. Several writers on this subject are, however, of a different opinion, and particularly Dr. Bartley, who goes so far as to recommend that pregnancy shall be considered a proof of acquiescence, and that, in order to ascertain this, the punishment of the criminal be delayed till the requisite time.‡

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* The faculty of Leipsic decided, "dormientem in sella virginem insciam deflorari posse." Valentini Novellæ, p. 30, 31. In his introduction, (page 2,) our author sneers at the ridiculous decision in this case. "Non omnes dormiunt, qui clausos et conniventes habent oculos."

† See on this question, Foderè, 4, p. 367; Capuron, p. 52; Smith, p. 401; and Brendelios, p. 96 and 98—9. This last doubts its possibility, even in the exceptions stated in the text.

‡ Bartley, p. 43. The scope of his argument is, that the depressing passions, such as fear, terror, &c. will prevent the necessary orgasm from occurring. Farr intimates a similar opinion, (p. 43.) And so does Meierius, the editor of Brendel, (Note, p. 99.) Those who entertain the belief maintained in the tex, are Capuron, p. 57; Foderè, 4. p. 369; Metzger, p. 257, 486.—"Dr. Good," says the editors of the Quarterly Journal of Foreign Medicine and Surgery, vol. 5, p. 97, "thinks it possible, though not very likely, that impregnation should succeed to rape." I will here express my regret at not being able to obtain the great work of the last author in time for using it in the present treatise. I have no doubt that it contains many facts of which I might properly avail myself.

The law is in accordance with the opinion advanced above. Foderè mentions that there is a decree of the parliament of Toulouse, which decides in the affirmative, and that on the opinion of physicians, who reported, "*Posse quidem voluntatem cogi, sed non naturam, quæ semel irritata pensi voluptate fervescit, rationis, et voluntatis sensum amittens,*"* The English law anciently appears to have considered pregnancy as destroying the validity of the accusation. Dalton quotes Stamford, Britton, and Finch, in favour of this opinion, but later writers, and in particular Hawkins and Hale, question its correctness, and deny its being law.† "It was formerly supposed," says East, "that if a woman conceived, it was no rape, because that showed her consent; but it is now admitted, on all hands, that such an opinion has no sort of foundation either in reason or law."‡

A few words are necessary on the *crime against nature*, and they may be properly introduced here. It may be required to examine the individual on whom it has been committed. If without consent, inflammation, excoriation, heat and contusion will probably be present. The effects of a frequent repetition of the crime, are a dilatation of the sphincters, ulcerations on the parts, or a livid appearance, and thickening. It has been suggested, that secondary symptoms of lues might be mistaken for these, but I am hardly of this opinion. No man, however, ought to be condemned on medical proofs solely. The physician should only deliver his opinion in favor or against an accusation already preferred.§

The punishment of this crime has always been signal. Death was prescribed by the Jewish and Roman laws, and is still by the English; and, where both consent, provided the one on whom it is committed is above the age of fourteen, both are punished. In this state, it was also formerly made capital, but now is changed to imprisonment for life.

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* Foderè, 4, p. 369.

† Burn's Justice, Art. Rape.

‡ East's Crown Law, vol. 1, p. 445.

§ Zacchias, 1, p. 382. Foderè, 4, p. 274. Mahon, 1, p. 138.

CHAPTER VI.

PREGNANCY.

1. Laws of various countries concerning the presence of pregnancy in civil and in criminal cases.—2. Signs of real pregnancy. Uncertainty to which they are liable. Quickening—explanation of it. Impropriety of relying on any single proof of pregnancy. Concealed pregnancy. Moles. Hydatids. Pretended pregnancy.—3. Superfœtation. Cases which are deemed instances of it—explanation of them by the opponents of this doctrine. Its application in legal medicine.—4. Whether a female can become pregnant without her knowledge, and remain ignorant of it until the time of labour. Cases in which this has been deemed possible.

Few questions occur in legal medicine of greater importance than the one we are about considering. On its proper decision may depend the property, the honour, or the life of the female. It will probably lead to a better understanding of this subject, if we notice

1. The laws of various countries relating to the presence of pregnancy.

2. The signs of real pregnancy, together with the best mode of ascertaining concealed or pretended pregnancy.

3. The arguments and proofs in favour and against the doctrine of superfœtation; and,

4. Some questions arising out of the previous examination.

I. *Of the laws of various countries which relate to the presence of pregnancy.*

The Roman laws exempted a condemned female from punishment, if she was pregnant, until after her delivery—"*quod prægnantis mulieris damnatæ pœna differatur quoad pariat.*"

There are two cases in the English or common law, which may require a knowledge of the signs of pregnancy. One is a proceeding at common law, "where a widow is suspected to feign herself with child, in order to produce a suppositious heir to the estate. In this instance, the heir-presumptive may have a writ *de ventre inspiciendo,* to examine if she be with child or not; and if she be, to keep her under proper restraint, until delivered. But if the widow be, upon due examination, found not pregnant, the presumptive-heir shall be admitted to the inheritance, though liable to lose it again, on the birth of a child within forty weeks from the death of a husband."*

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* The interest that cases of this nature sometimes occasion, and the precautions that have been taken in England, may be learned from the following report: Sir Francis Willoughby died, seised of a large inheritance. He left five daughters,

The other instance is in accordance with the Roman law, as quoted above. When a woman is capitally convicted, and pleads her pregnancy, though this is no cause to stay the judgment, yet it is to respite the execution till she be delivered. "In case this plea be made in stay of execution, the judge must direct a jury of twelve matrons, or discreet women, to ascertain the fact, and if they bring in their verdict, *quick with child*, (for barely *with child*, unless it be alive in the womb, is not sufficient) execution shall be staid generally till the next session, and so from session to session, till either she is delivered, or proves, by the course of nature, not to have been with child at all."*

Foderè and Capuron appear to have examined every law in the French code, which has a bearing on this subject. The civil code, sect. 185, declares, that no female shall be allowed to contract marriage before the age of fifteen full years. Nevertheless, such marriage shall not be dissolved, 1, when six months have elapsed after the female or both of the parties have attained the required age; and 2, *when the female, although not of the required age, has become pregnant before the expiration of six months.* The penal code, sect. 27, also declares, that if a female condemned to die, states that she is pregnant, and if it be proved that she is so, she shall not suffer punishment until after her delivery. Several other laws are mentioned, which, by implication, may be referred to this subject, but it is not necessary to state them. The above are the important ones now in force in France. I may, however, add, that the law last quoted was in existence, and had been acted upon, since the year 1670, in that country.†

(one of whom was married to Percival Willoughby,) but not any son. His widow, at the time of his death, stated that she was with child by him. This declaration was evidently one of great moment to the daughters, since, if a son should be born, all the five sisters would thereby lose the inheritance descended to them. Percival Willoughby prayed for a writ *de ventre inspiciendo*, to have the widow examined; and the sheriff of London was accordingly directed to have her searched by twelve women, &c. Having complied with this order, he returned that she was twenty weeks gone with child, and that within twenty weeks, *fuit paritura*. "Whereupon another writ issued out of the Common Pleas, commanding the sheriff safely to keep her in such an house, and that the door should be well guarded; and that every day he should cause her to be viewed by some of the women named in the writ, (wherein ten were named,) and when she should be delivered, that some of them should be with her to view her birth, whether it be male or female, to the intent there should not be any falsity. And upon this writ the sheriff returned, that accordingly he had caused her to be kept, &c. and that such a day she was delivered of a daughter." *Croke's Elizabeth*, p. 566. See also, in the matter of Martha Brown, *ex parte* Wallop, in Brown's Chancery Cases, 4, p. 90, and *ex parte* Aiscough, Peere Williams' Reports, 2, p. 591.

* Blackstone, 4, p. 394, 395. There is another case where the court has interfered on proof of the existence of pregnancy being brought before it, and that is, where a female in this situation is imprisoned. Thus, in the case of Elizabeth Slymbridge, (Croke's James, 358,) "upon suggestion that she had been imprisoned for divers weeks, and was with child, and would be in danger of death, if she should not be enlarged," Sir Edward Coke, the chief-justice, admitted her to bail, to prevent the peril of death to her and her infant; and, in giving his opinion, he cites a similar case, which happened in the 40th of Edward III. The editor remarks, that *these cases are cited as extraordinary instances*. The last case is mentioned in Coke Littleton, 289. *a*. The record states, "Quia eadem Elena pregnans fuit, et in periculo mortis, ipsa dimittitur per manucaptionem, &c. ad habendum corpus," &c.

† Foderè, 1, p. 321 to 432. A law, passed on the 23d Germinal, year 3. (1795,)

II. *Of the signs of real pregnancy, and of concealed and pretended pregnancy.*

In the ordinary practice of medicine, but little difficulty ever occurs in ascertaining the presence of pregnancy. The female, when she consults a physician, is frank in her avowal of the symptoms present, and from her narrative an opinion sufficiently accurate can generally be formed. The reverse, however, takes place in legal medicine. Here, pregnancy may be CONCEALED by unmarried women, and even by married ones, under certain circumstances, to avoid disgrace, and to enable them to destroy their offspring in its mature or unmature state. It may also be PRETENDED, to gratify the wishes of relatives—to deprive the legal successor of his just claims—to extort money, or to delay the execution of punishment.

Neither of these can be properly investigated, without recurring to the signs of real pregnancy, and this remark deserves particular notice, since, with all the light that modern science affords, serious errors have notwithstanding been committed. The female has an interest, and a wish to deceive the examiner, and her testimony, which, in ordinary cases, is so much relied on, is here suspicious, or not to be credited.

Mahon has suggested a useful division of the signs of pregnancy, viz. those which affect the system generally, and those which affect the uterus.*

The changes observed in the system from conception and pregnancy, are principally the following; increased irritability of temper, melancholy, a languid cast of countenance, nausea, heart-burn, loathing of food, vomiting in the morning, feverish heat, with emaciation and costiveness, occasionally depravity of appetite, a congestion in the head, which gives rise to spots on the face, to head-ache, and erratic pains in the face and teeth. The pressure of increasing pregnancy sometimes occasions varicose tumours, or anasarcous swellings of the lower extremities. The breasts also enlarge, an areola, or brown circle, is observed around the nipples, and a secretion of lymph, composed of milk and water, takes place.

All of these do not occur in every pregnancy, but many of them in most cases.†

The changes that affect the uterus, are—a suppression of the menses.

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was still more mild in its provisions. It prescribed, that no woman, accused of a capital crime, *should be brought to trial, until it was properly ascertained that she was not pregnant*. In conformity with this, the court of cassation reserved several decisions of inferior criminal courts, where it appeared that the female had not been properly examined; and it seems, indeed, that they demanded proof that in such cases the examination had always been made. (Ibid. p. 428 to 431.) This is probably abolished, as no mention is made of it in the code now in force.

* Mahon, 1, p. 142.

† Denman, chap. 7. Foderé, 1, p. 434, &c. Dr. Denman observes, that much regard should be paid to the navel in cases of doubtful pregnancy. It emerges in real cases, until it comes to an even surface with the integuments of the abdomen, (p. 227.) Mahon, however, remarks, that in many cases of dropsy, the same appearance is seen. (Vol. 1, p. 155.)

These cease returning at their accustomed period.—An augmentation in the size of the womb. This is not perceptible until between the eighth and tenth week. At that time, the fœtus, with the surrounding membranes, and the waters contained in them, so enlarge it, that it may be felt lower down in the vagina than formerly; nor does it ascend, until it becomes so large as to arise out of the pelvis; and this is accomplished at about the fourth month. In the intermediate space, an examination *per vaginam*, will discover the uterus to be heavier and more resisting; and by raising it on the finger, this indication will be particularly remarked between the third and fourth months. The enlargement continues—it becomes visible, and at the seventh month the uterus is as high as the umbilicus, and at the eighth, as the pit of the stomach. A short time before delivery, it somewhat subsides. About the middle of the pregnancy, or between the seventeenth and twenty-second week, the female feels the motion of the child, and this is called *quickening*. Its variations as to time will be hereafter noticed. The vagina is also subject to alteration, as its glands throw out more mucus, and apparently prepare the parts for the passage of the fœtus.

These, as now stated, are the signs of pregnancy usually enumerated. It would not, however, be doing justice to the subject, if the reader were left to suppose that all or most of them are the invariable attendants on pregnancy. Some may accompany diseases; others may be altogether wanting in a state of true pregnancy. It will, therefore, be proper to examine the more important signs in detail.

1. *Of the expansion or enlargement of the abdomen.* This sign is not visible during the first months; and, after that period, it may be concealed for a length of time by various means, such as the peculiar disposition of the dress, and the confinement of the abdomen by stays. Formerly, fashion lent its aid to this deception. As early as 1563, satires were written in France on the articles of dress that were used to increase the size of the female figure, both before and behind; and in 1579, in the reign of Henry III. they were in general use. Cotemporary writers considered them, and not without great reason, as subservient to, and productive of, great depravity in manners, and particularly for the concealment of pregnancy.* Another circumstance that may lead to error, is the variety that exists with respect to corpulence. This, in some instances, conduces to render the question doubtful. Waiving these, however, we observe, that this sign is generally observed at the end of the fourth month. It then remains to enquire whether the enlargement is the result of disease, or of pregnancy. If the former, it may originate from suppression of the menses, tympanites, dropsy, or schirrosity of the liver and spleen. In tympanites, however, the abdomen is hard and elastic, and sounds like a drum when pressed; and there are irregular elevations, which appear to roll under the finger. Dropsy, also, when not encysted, is characterized by its peculiar symptoms; and schirrosity, by its indurated and unequal swelling. All these diseases, if the observer exer-

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* British Critic, 7, p. 539.

cious patience and judgment, may be distinguished from pregnancy.[*] Encysted dropsy will be understood with more difficulty, as no fluctuation will be observed; and the best advice probably is, to mark the symptoms, as they daily become more aggravated in this disease, while the slighter affections of pregnancy generally wear off.[†] Even if we have settled that there is a tumour of the uterus present, it is not certain that it is caused by a fœtus. It may arise from a mole, from hydatids in the uterus, or from a schirrous state of that organ.—These remarks sufficiently prove, that enlargement of the abdomen is a sign of little importance in determining the question of pregnancy. It should always be noticed, but never relied *on*.[‡]

2. *A change in the state of the breasts* has by many been considered as a sign. They are said to become larger, while the areola round the nipples is of a brown colour; and this is accounted for on the principle of revulsion—the blood, after the cessation of menses, being determined upwards, in consequence of the connexion that subsists between the breasts and uterus. It is, however, a fallacious proof. Suppression of the menses may also cause it; and it is not universally present in real pregnancy.[§] Even the appearance of milk, which is so common towards the latter stages, may be unattended with pregnancy. Hebenstreit states, that he has known females in whom this fluid was produced by repeated friction, suction, &c.[‖] A servant girl, says Belloc, slept in a room with a child whom it was wished to wean. Being disturbed in her repose by its cries, she imagined that by putting it to her breasts it might be quieted. In a short time she had milk sufficient to supply its wants.[¶] An account is also given in a MS. in the collection of Sir Hans Sloane, of a woman, at the age of 68, who had not borne a child for more than twenty years, nursing her grandchildren, one after another.[**] Similar cases are mentioned by Foderè;

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[*] Mistakes have, however, been made by eminent men, with respect to dropsy. A case of uterine dropsy is mentioned in the Phil. Trans. vol. 18, p. 20. There was a determination of fluids to the breasts, and the menses were suppressed. The female, however, went past her time, continued enlarging, and finally died. The disease was found on dissection. Encysted dropsy was also mistaken for pregnancy by Tulpius, and other eminent men. (Phil. Trans. 9, p. 137.)

[†] An instructive case, shewing the doubts which envelope some cases of suppression of the menses, and the equivocal symptoms to which it gives rise, is related by Dr. Dewees, in Chapman's Journal, vol. 4, p. 126.

[‡] If an examination at this early period of pregnancy be deemed necessary, the following directions of Foderè and Mahon should be observed. Empty the intestinal canal, and let the female lie on her back, with the knees a little elevated, so as to prevent any tension of the abdomen. If the woman be not too fat or deformed, the uterus may be felt through the parieties of the abdomen, by applying the extended hand over the middle of the hypogastrium, so that the thumb touches the navel, and the small finger the pubis. On her making an expiration, the enlarged uterus may be felt hard, and of a spherical form. If these be present, they *indicate an increase in size of the uterus, but not the cause of it.* (Foderè, 1, p. 448. Mahon, 1, p. 149. See also Smith, p. 485.)

[§] Denman, p. 227. [‖] Hebenstreit, p. 185. [¶] Belloc, p. 70.

[**] Smith, p. 484. In the Phil. Transactions, similar cases are related. One grand-mother, at sixty, suckling her grand-child, (vol. 9, p. 100;) and another, at sixty-eight, suckling two grand-children. This last was seen by Dr. Stack, who relates the case. (Vol. 41, p. 140.)

and, in particular, he relates an instance of a female, who, on the point of being conducted to prison, declared herself a nurse. Although this was a falsehood, yet in a few moments she produced the requisite proof. The author also suggests, that immediately after the cessation of the menses, milk is often secreted.[*]

2. *The suppression of the menses.* This may take place from disease, without the presence of pregnancy; and again, it is asserted, that the menses have continued in certain cases during pregnancy. Dr. Denman and others, however, conceive that this symptom is a never-failing consequence of conception; and the former, in particular, intimates that a contrary opinion has its origin in credulity or vanity. It is certainly a strong argument, that an individual of the extensive practice of this accoucheur, never met with a case invalidating the rule; but it is no less true, that observers of equal eminence have occasionally witnessed deviations from it. Dr. Heberden knew a female who never ceased to have regular returns of the menses during four pregnancies, quite to the time of her delivery.[†] Deventer mentions of one who became pregnant before menstruating, and immediately after conception, this discharge returned periodically until her delivery, and this was the case during several successive pregnancies—inverting, as it were, the usual order of nature.[‡] Dr. Francis states, that Dr. Hosack had a patient, who, during her last three pregnancies, menstruated until within a few weeks of her delivery, and, notwithstanding, brought forth a healthy child at each labour.[§]

As to the diseases which produce suppression, but few remarks need be made. They are soon characterised by symptoms with which the practitioner is familiar. Cases may, however, occur, as mentioned in a former chapter, (page 39,) where the menstrual fluid is confined by a substance closing the vagina. This produces enlargement, and several other suspicious appearances. It is proper, therefore, to recollect that such a condition of the parts is possible.

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[*] Foderè, 1, p. 440. Dr. Francis, in his edition of Denman, gives the following case on the authority of Professor Post. "A lady of this city (New-York) was almost fourteen years ago delivered of a healthy child, after a natural labour; since that period, her breasts have regularly secreted milk in great abundance, so that, to use her own language, she could at all times easily perform the office of a nurse. She has uniformly enjoyed good health: is now about thirty-five years of age, and has never proved pregnant a second time, nor had any return of her menses." (Denman, p. 229.)—Even men are said to have suckled children. Thus the bishop of Cork relates a case in the Phil. Transactions, where the father had fed his child in this way. (Vol. 41, p. 810.) He examined the breasts, and found them very large. It does not appear, however, that he saw the act itself.

Humboldt states a case where an Indian saved his child from starving, by applying it to his nipple, and that the breast continued permanently enlarged.—EDITOR.

[†] Heberden's Commentaries. See also Haller, vol. 7, part 2, p. 142, for references to cases of a similar nature. A remarkable case is mentioned by Dr. Francis in the New-York Med. and Phys. Journal, vol. 2, p. 14.

[‡] Foderè, 1, p. 437.

[§] Francis' Denman, p. 231. Dr. Francis also mentions a case in his own practice. Capuron observes on this sign, "Quelquefois l'ecoulement periodique des menstrues dans le premier mois, même pendant tout le temps de la grossesse." (Page 63.)—Belloc, p. 62, makes a similar remark. Those who deny the presence of the menses, consider the discharge as a hæmorrhage from the vagina.

I will add in this place, principally for the purpose of citing a case from Belloc, that pregnant females may feign menstruation by staining their linen with blood. This deception was attempted on him by a girl three months advanced.[*]

Notwithstanding the exceptions now stated, we should attach great importance to the absence of the menses as indicating pregnancy, and the remarks of Belloc on this point are deserving of great attention. "When a female experiences the suppression, along with other symptoms of pregnancy, we may consider her situation as yet uncertain, because these signs are common to amenorrhœa and pregnancy. But if, towards the third month, while the suppression continues, she recovers her health, and if her appetite and colour return, we need no better proof of pregnancy. Under other circumstances, her health would remain impaired, and even become worse."[†]

4. I merely notice *loss of appetite, nausea, vomiting, &c. &c.* to state that they are altogether equivocal. They accompany many diseases—are wanting in many pregnancies, and even if present, occur in the early stages, the time precisely when no certain judgment can be formed.

5. Another sign that has been depended on, is the *motion of the fœtus in the womb of the mother.* It is wanting in the early months of pregnancy, but during the latter ones, may generally be ascertained. This sensation, however, which in real pregnancy the female always mentions at an early period, is of course not spoken of in concealed cases, and it remains with the examiner to discover it by other means. To this end, he dips his hand in cold water, and applies it suddenly over the region of the uterus. If the fœtus is alive, its motion will be felt, except, according to authors, where it is very feeble, or where the woman is dropsical. But, unfortunately, this sign is not infallible, the fœtus may be dead, or there may be twins, in which case the motion is sometimes not felt until a late period. On the other hand, flatus in the bowels, nervous irritation,[‡] or a mole in the uterus, has been mistaken for it. A case, showing the uncertainty of its occurrence, is related by Capuron A female, with a very large abdomen, was received into one of the hospitals of Paris. She was visited by many distinguished accoucheurs, surgeons, and physicians. Some declared that she laboured under ascites—others, that a schirrous and dropsical ovarium was present. An abdominal pregnancy was also suspected, but no one believed it to be real pregnancy, since no motion of the fœtus could be felt. The woman was kept on light food, and innocent remedies were administered. The volume of the abdomen enlarged, and at last, after three weeks of examinations and consultations, a strong and healthy child was born.[||]

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[*] Belloc, p. 65. "Il faut exiger alors que parties soient lavées avec de l'eau tiede; si le sang ne reparait pas, le cas est suspect." Capuron, p. 81.

[†] Belloc, p. 60. Smith, p. 485.

[‡] Many of the French writers on midwifery speak of a "*fausse grossesse nerveuse.*"

[||] Capuron, p. 73, 74.

This motion of the fœtus, when felt by the mother, is called QUICKENING. It is important to understand the sense attached to this word formerly, and at the present day. The ancient opinion, and on which indeed the laws of some countries have been founded, was, that the fœtus became animated at this period—that it acquired a new mode of existence. This is altogether abandoned. The fœtus is certainly, if we speak physiologically, as much a living being immediately after conception, as at any other time before delivery; and its future progress is but the developement and increase of those constituent principles which it then received. The next theory attached to the term, and which is yet to be found in many of our standard works, is, that, from the increase of the fœtus, its motions, which hitherto had been feeble and imperfect, now are of sufficient strength to communicate a sensible impulse to the adjacent parts of the mother. In this sense, then, quickening implies the first sensation which the mother has of the motion of the child which she had conceived.*

A far more rational, and undoubtedly more correct opinion, is that which considers quickening to be produced by the *impregnated uterus starting suddenly out of the pelvis into the abdominal cavity.* This explains several peculiarities attendant on the phænomenon in question—the variety in the period of its occurrence—the faintness which usually accompanies it, owing to the pressure being removed from the illiac vessels, and the blood suddenly rushing to them; and the distinctness of its character, differing, as all mothers assert, from any subsequent motions of the fœtus. Its occasional absence in some females is also readily accounted for, from the ascent being gradual and unobserved.†

This subject will again be noticed in the chapter on Abortion. At present, it will be sufficient to remark, that considerable variety occurs as to the *time* of quickening. Dr. Denman observes, that it happens from the tenth to the twelfth week, but most commonly about the sixteenth, after conception. Again, Puzos, a celebrated continental accoucheur, says, that it takes place at the end of two months, but most commonly at the expiration of eighteen weeks. Hydropic women, he adds, do not observe it until the sixth or seventh month.‡ And in a late trial for abortion in England, the medical witness deposed that it took place at eighteen weeks, sometimes in fourteen, and sometimes not till twenty weeks, but mostly at eighteen. That he never knew it so late as twenty-five, though it might happen, in some cases, at twenty-one or two.

This discordance in the observations of physicians is readily explained, by recurring to the cause just now assigned. And we may reasonably suppose, that the motion in question will be soonest felt when the developement has been most rapid. The practical deduction respecting it, in a case of supposed pregnancy, is not to pronounce a female unimpregnated, because it cannot at once be felt. The examination should be frequently repeated, before a decisive opinion be given.

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* See Denman, &c.

† Mr. Royston appears to have been the first that satisfactorily developed this opinion to the public, although he gives the credit to Dr. H. S. Jackson, of originally advancing the idea. See his paper, copied from the London Med. and Phys. Journal, in the Eclectic Repertory, vol. 3, p. 25. Writers on midwifery are embracing this opinion. See Conquest, p. 38; and also Hogben, in London Med. Repository, 1, p. 146.

‡ Foderè, 1, p. 446.

§ Edinburgh Med. and Surg. Journal, 6, p. 248.

6. The last sign that I shall notice is an *alteration in the state of the uterus;* and this is ascertained by what is called the *touch.* It is founded on the following physiological facts. After conception, the fundus and body of the uterus both increase, and the former, from its becoming heavier, will naturally descend lower down in the pelvis, and thus project farther into the vagina. The uterus remains in this situation until it become so large as to rise out of the pelvis; and, accordingly, this temporary abbreviation of the vagina is a sign of pregnancy, though, of course, an equivocal one. The body of the uterus also enlarges, and the neck of it becomes shorter, and finally is completely effaced. During the period that this is taking place, and which is generally the fifth, sixth, and seventh months, the vagina is more elongated, since the uterus rises further up. It gradually descends towards the period of delivery. The os uteri also varies with the changes in the cervix. The lips gradually flatten and disappear, and, towards delivery, a small rugous hole only is discoverable.*

Now, with a knowledge of these facts, we may proceed to an examination, to ascertain their presence. Having evacuated the bladder and intestines, the female is laid in such a position, that the muscles of the abdomen may be in a state of relaxation. The fore and middle fingers of the right hand are then introduced into the vagina, whilst the abdomen is to be felt with the left. The orifice of the uterus, its neck and body, are then examined, and having hold of the uterus, it is gently moved, until motion is perceived.†

This investigation, it will be perceived, elucidates the state both of the womb and of the fœtus. It is certainly one of the most unequivocal modes of ascertaining pregnancy. But it requires long habit to become expert at it, and this few practitioners will have an opportunity of obtaining. The most distinguished accoucheurs have been, and probably will continue to be, deceived with it. Of this, the works of Mauriceau and Baudelocque bear testimony; and Foderè relates a case which should make every physician distrust his skill. In a hospital where he attended, a female was detained on suspicion of being pregnant. Several medical persons visited and examined her. Some declared, that she was in the eighth month of pregnancy, whilst others denied that she had ever conceived. She was kept in the hospital during a whole year, and was then dismissed as large as ever.‡

There are also some varieties in the conformation of parts that render this sign useless, or unavailable. The neck of the uterus is oftentimes seated very low, both in married and unmarried females, while in others, it is almost out of reach. Moles and hydatids also produce an increase in the volume of the uterus, and an examination by the touch, may give an impression very similar to that of a child contained in it. But, above all, the value of it is diminished, from the fact that it can be made with most readiness at the early stages of pregnancy, when the uterus is low down, while, at the seventh month, the uterus has risen high up, and can be examined with much greater difficulty. It can thus be applied with greater certainty of success only at periods, when our opinions at the best must be doubtful.

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* Denman, W. Hunter, Burns. The os uteri is also found closed with a gelatinous matter.

† Foderè, 1, p. 450. Smith, p. 485.

‡ Foderè, 1, p. 451.

The result to which we have now arrived, will probably appear to many readers as an extraordinary one. But it is no less correct, and the distinction is the following. In ordinary life, the existence of pregnancy is readily known and observed. The cases in which females have made mistakes on this point are few, and those few, from the fear of ridicule, are studiously concealed. We are hence led to form an opinion, that nothing can be more readily known than this. But the case is altered, when a medical witness is called upon to prove its existence on oath.* He is then bound to weigh all the *possible causes* that may produce these various symptoms, and he is to recollect that all of them have occasionally proved equivocal. *There is no one invariable sign of pregnancy*, and it is probably well that there is not.† It will teach the physician that delay is all-important—that before deciding, his examinations should be frequently repeated, and that an opinion should seldom be hazarded before the end of the sixth month. When it is recollected that he may have the life of a fellow-being and her property at his disposal, surely he will not desire to be in haste on so important a subject.‡

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* Mary Heath was tried, before the Court of King's Bench in Ireland, for perjury in the great Annesley cause. The object of this cause was to ascertain whether James Annesley was the son of Lord Altham. On the trial of Mary Heath, Dr. Samuel Jemmat, an aged and respectable practitioner, testified that he had formerly been consulted by Lady Altham, and found her with child. She had all the usual symptoms. One of the counsel asked him, "Upon your oath, sir, are there any rules in your profession, by which a pregnancy can be discerned from a tympany, or any other like disorder? *Answer*. By virtue of my oath, *that question would puzzle not only the colleges of physicians of England and Ireland, but the Royal Society too.—Jury*. Is there such a thing as a false conception? *A*. Very often, a mola, there is.—*Q*. Are the symptoms the same? Have women grown big with a false conception. *A*. They have done it."—Hargrave's State Trials, vol. 9, p. 463.

† "Concludamus ergo, ex prædictis; quod certa pregnantiæ cognitio ex nullis signis indubitato haberi potest, sed bene conjecturalis ac dubia; nullum enim signum tam proprium pregnantiæ habemus, quod ex aliqua præternaturali causa originem haberi non possit." Zacchias, vol. 1, p. 90.—"Toute notre sagacité, mise en œuvre, ne peut nous fournir aucun signe invariable que determine l'existence du fœtus dans la matrice." (Mahon, 1, p. 141.) "The verification of the pregnant state cannot depend on the importance due to *any particular* sign. It must depend on the existence of several." (Smith, p. 484.) See also Foderè, 1, p. 486. Capuron, p. 81.

‡ Cases are said to be mentioned by various writers, as Ambrose Parè, Mauriceau, &c. where female criminals have been executed on the decision of examiners, that pregnancy was not present; and, notwithstanding, a fœtus has been found after death. The following, from Devenux, is a melancholy example. In November, 1655, in France, several midwives examined a female under sentence of death, and

Intricate then as this subject is, and as it has been our object thus far to show, we must not, however, proceed to an opposite extreme, and abandon these signs as altogether uncertain. The cases where, by our laws, the physician is called upon to examine, are precisely those in which delay can only cause temporary injury as to property, and it may prolong life, even if guilty—and he should therefore give an opinion for or against the *probability* of the existence of pregnancy. He is therefore justified, in cases where it is supposed to be concealed, in giving a strong opinion in favour of it, *when the menses are suppressed, and the patient continues in good health; when the abdomen gradually enlarges, the breasts increase in size, and the areola around them becomes dark-coloured; and when, on examination, the motion of the fœtus is perceived, and the neck of the uterus is found diminishing, and its orifice thin.* The combination of these symptoms is calculated to prevent that error to which the study of a single one might lead.[*]

A few remarks are here necessary, with respect to *extra uterine pregnancy.* The early symptoms of it are generally the same as in common gestation—the abdomen and uterus enlarge, the menses are suppressed, the breasts increase in size, and very often the child quickens at the proper time, but is more felt on one side than on the other. On examination, however, the uterus is not found, after the middle of pregnancy, to take on those changes in its body and neck which we have before described. Severe pain is also not an uncommon attendant of these cases. At the end of eight, nine, or ten months of gestation, appearances of labour come on, and continue for a longer or shorter period of time; the motions of the child cease, and milk is secreted. The case terminates sometimes in death, from the irritation produced; sometimes the fœtus is voided by the natural passages, while again it will remain in the abdomen for years, without affecting the health.[†]

Should the physician, as a medical jurist, suspect the presence of a case of this kind, he can do nothing more than desire a delay until the supposed termination of the gestation. The proofs are not so infallible, but that a fœtus in utero may possibly be present.

The most difficult case of concealed pregnancy that probably can occur, is when it is accompanied with ascites. The motion of the

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deposed that no sign of pregnancy was present. She was executed; but, on dissection, a fœtus, of the third or fourth month, was discovered. The midwives were severely admonished by the magistrates; and it was decided, that whenever a female declared herself pregnant, her punishment should be delayed for a sufficient length of time to determine the certainty of the fact. (Foderè, 2, p. 444.)

[*] It has been lately announced, that pregnancy may be discovered by *auscultation;* and that the operation may be performed either by applying the ear to different parts of the abdomen, or by using the *stethoscope* of Laennec. The discovery does not appear as yet sufficiently matured. Some interesting particulars concerning it may be found in the New-England Journal, vol. 11, p. 426; the Journal of Foreign Science, vol. 2, p. 706; and the Quarterly Journal of Foreign Medicine and Surgery, vol. 4, p. 371.

[†] A very full collection of references to cases of extra-uterine pregnancy, will be found in the notes to Burns' Midwifery. Additional ones are mentioned in Foderê, 1, p. 453 to 459; and in the Phil. Trans. *passim.*

fœtus cannot be perceived; and it is also added by Foderé, that the uterus does not take on its ordinary developement. Yet many cases are on record, where females, with this disease on them, have been delivered of healthy children. In suspected cases, the practitioner should weigh the symptoms, and ascertain whether they are all referable to the disease—his medicines should be mild, and patience exercised as to the event.*

In the sketch now given, of the signs of real pregnancy, most of the remarks are directly applicable to concealed or pretended cases. With respect to the latter, I may observe, that in addition to the circumstances already enumerated, the following should also be noticed. 1. *The age of the individual.* No female can be impregnated in our own climate under the age of thirteen, nor above that of fifty, provided she has been previously barren.† There are exceptions to this, but it is correct as a general rule.‡—Again, impregnation is supposed to depend on menstruation; and this last, in fact, constitutes in every country the state of puberty. There are, however, cases on record, where females have become pregnant without ever menstruating. Sir E. Home, in the Philosophical Transactions of 1817, mentions the case of a young woman who married before she was seventeen, and although she had never menstruated, became pregnant. Four months after her delivery, she became pregnant a second time; and four months after the second delivery, she was a third time pregnant, but miscarried. After this, she menstruated for the first time, and continued to do so for several periods, and again became pregnant.§ 2. We should ascertain, whether any of the causes of sterility, as already enumerated, be present. 3. Women often fancy themselves pregnant when the menses cease. This great change in the system often produces enlargement of the abdomen, nausea, and the breasts fill with a milky fluid. Caution is necessary in such cases, in giving a decided opinion; and Van Sweiten mentions two instances which teach a valuable lesson. A female had a son when she was twenty-five years of age; twenty years after, she declared herself pregnant the second time. This was disbelieved by all, but it was verified in due season. Again, a female had been delivered of fourteen children, and might hence be supposed to be well acquainted with the signs of pregnancy. After the birth of the last child, the menses ceased for eight years; and, at the end of this time, she supposed herself again pregnant; but a few months reduced her size, and showed that she had been mistaken. 4. There are various substances or fluids formed in the uterus, which cause the female to imagine that she is in this state. Of this description are moles and hydatids.

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* A memoir by Scarpa, on *pregnancy accompanied by ascites*, is published in the Quart. Jour. For. Med. and Surg. vol. 1, p. 249. This distinguished surgeon performed the operation with success in a case related by him. The children (it was a twin case,) died, however, in a few seconds after delivery.

† Heat, whether natural or artificial, seems to produce sexual maturity in the animal body, in a way perhaps analogous to that which it performs, on the same principle, in the vegetable kingdom. Bruce mentions, that in Abyssinia, he has frequently seen mothers of eleven years of age. In Bengal, I have seen many girls come to the age of puberty at that period, and sometimes a mother under the age of 12. I formed an opinion, tho' perhaps I had not a sufficient number of facts to bear me out in it, that precocious pubescence was to be found more frequently among an unfortunate class of females, who are sold when very young by their parents, for the purpose of prostitution, and who being brought up in the stews, their passions are daily excited by voluptuous and licencious scenes. In Manchester and Glasgow, the girls who work in the cotton-mills, which are of necessity kept at a high temperature, and where morality is not at a much higher pitch than in a Rhindy Ghurr in India, the same effect obtains.—Editor.

‡ Many cases of births in advanced age are on record. See Capuron, p. 93 and 98. The succession to an estate was disputed in France, because the mother was fifty-eight years old when the child was born. It was decided in favour of the applicant, because similar instances are mentioned by ancient and modern writers. Smith, p. 493, mentions cases of early and late fecundity. I quote the following, because it happened lately. "May, 1816, Mrs. Ashley, wife of John Ashley, grazier, of Firsby near Spilsby, at the age of 54, was delivered of two female children, which, with the mother, were likely to do well." Edinburgh Annual Register, vol. 9, part 2, p. 508.

§ Francis' Denman, p. 174. See Foderè, 1, p. 396; Capuron, p. 96, for similar cases. Also Moseley on Tropical Diseases, p. 103 104. " Ego habui amicam

The term *mole* does not appear to be very accurately defined. I shall understand by it, a fleshy substance contained within the cavity of the uterus—enveloped in a membrane, and generally filled with blood, although occasionally dry. On cutting into it, various parts, resembling an imperfect fœtus, will be observed. The symptoms produced are at first very similar to those of pregnancy. The stomach is affected, and the breasts and belly enlarge. The latter, however, increases much faster, and is softer and more variable in size than in real pregnancy. It is sometimes as large at the second month as in the fifth of perfect conception. The duration of this is uncertain; but it generally comes away at the third or fourth month, although in some cases it has not been evacuated until the sixth or seventh, and it is even said to have been retained for years.*

This term has also been applied to those coagula which not unfrequently accompany the process of menstruation, and which appear to have remained so long in the uterus as to have retained the fibrous parts of the blood only. Many unmarried females discharge these, and they should be accurately distinguished from the former. The one is to be deemed the product of conception, and the other not.† And

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laudabilis temperamenti et complexionis, quæ octo filios tulit consequenter, id est, omni anno unum, nunquam tamen visa una gutta sanguinis menstrui." (Low, p. 523.)—Impregnatio nullis unquam præviis menstruis. (Stalpart, vol. 2, Obs. 31.)—A case is also mentioned by Prof. James, of Philadelphia, of a female who had not menstruated for *nearly two years before her pregnancy*. (Hosack's Med. and Phil. Register, vol. 4, p. 422.) See also New-York Med. and Phys. Journal, vol. 2, p. 13; and Eclectic Repertory, vol. 2, p. 119.

* A case came before the parliament of Paris in 1781, in which the female sued for damages, for seduction. Twenty months after this was alleged to have been committed, she brought forth a mole. The parliament very properly decided against her, on the score of character; but they added, what may be questioned under the present acceptation of the term, *that unmarried females, and even nuns, have discharged moles, without any previous criminal connexion.* Foderè, 1, p. 477.

† "True moles are distinguished from the false, and other growths of the uterus, by their not deriving their origin from the substance of the womb, or its membrane;

these bloody coagula are wanting in the characteristics of a true mole, viz. the fleshy texture, and the enveloping membrane.

We have already remarked, that a true mole may be mistaken for real pregnancy during some months. By however attending to the following circumstances, the difficulty may in some degree be solved. The early and rapid increase in size of the uterus—the sensation of pressure, which often produces pain, and the want of motion when examining the uterus. This last, however, is seldom applicable, since the investigation is usually made in the early stages. Foderé adds, that the breasts are not filled with a milky, but with serous fluid, and that the female often experiences violent convulsive motions in her abdomen.[*] Occasional discharges of blood, *per vaginam*, during the gestation of the mole, are not uncommon.

Hydatids, or *dropsy of the uterus*, which I shall consider as synonymous,[†] are generally supposed to proceed from coagula of blood, or from portions of the placenta, degenerated during the process of pregnancy. There is, however, no doubt, that they are occasionally an original production of the uterus. It is not necessary to proceed to a minute description of them; but we may observe, that usually these watery vesicles hang together in clusters, occupy a considerable space, and produce a corresponding distention. Their early symptoms are those of pregnancy.[‡] The tumour of the abdomen, however, does not correspond to the supposed period, nor does the state of the uterus;[§] and at the accustomed time no motion is felt by the mother. There is more or less of disease of the system present as this gestation advances, contrary to what occurs in real pregnancy. There is no certain time for their discharge. Often, however, they do not come away, until some period after real pregnancy would have been accomplished. Their expulsion is attended with pain, often of the se-

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but by their being always the consequence of conception." Voigtel's Pathologica Anatomy, in Edinburgh Med. and Surg. Journal, vol. 11, p. 99.—"It is the opinion of many, that these substances are never formed in the virgin state, and no case that I have yet met with contradicts the supposition." (Burns, p. 79.)—See Denman, p. 149. Candour, however, obliges me to add, that some writers believe they may occur in chaste females. Smith, p. 298. Mahon appears to doubt their existence. Stalpart (vol. 1. Observ. 73,) relates some curious cases.

[*] Fodere, 1, p. 469.

[†] See Denman, p. 148; and the opinions of Drs. Baillie and Sprengel, quoted by Dr. Francis in favour of this belief. Dr. James, professor of midwifery in the university of Pennsylvania, has advocated a similar opinion. Eclectic Repertory, vol. I, p. 499. Jno. Burns, (chap. 10, Note 62,) however, considers them distinct diseases.

[‡] Mr. Charles M. Clarke considers the following as a diagnostic symptom of hydatids—*the occasional and sudden discharge of an almost colourless and inodorous watery fluid.* Journal For. Science, vol. 8, p. 85.

[§] Burns, p. 80. Do the parietes of the uterus increase as in real pregnancy, in cases where *hydatids of the uterus* alone are present: and is there any case, where an examination has been made on a pure female labouring under this disease? I have not been able to find any. It must be recollected, that hydatids may succeed to genuine pregnancy. The fœtus may die, and both it and the placenta degenerate into them.

verest kind, and occasionally with hæmorrhage.[*] An instructive case is related by Dr. Eights, where the female conceived herself pregnant, but felt no motion, and at the end of eight months was seized with pain, and occasional watery discharges. This continued some time, and then ceased. A month after, she was attacked with labour-pains and discharged about a gallon of hydatids. On the third day after this, there was a copious secretion of milk.[†] Mauriceau also states the case of the wife of President de Nemours, who was considered pregnant during a whole year, and at last was relieved by a copious watery discharge.[‡]

5. I will conclude this part of our subject with the following case, related to me by the late Dr. Low. In 1798, a female in the royal infirmary at Edinburgh stated that she was in labour. According to custom, a house-pupil was sent to attend her, which he did very faithfully for two days and two nights. At the end of that period, he sent for Dr. Hamilton, the professor of midwifery, who examined her, and much to the mortification both of the student and the woman, declared that she must become pregnant, before she could be delivered. The disease under which she laboured was *physometra*, or wind in the uterus—a complaint which is certainly very rare, but which practical writers mention as having occurred.[§]

Cases of pretended pregnancy have occasionally excited considerable attention, from peculiar circumstances attendant on them. Of this nature was the instance of Bianca Capello, the mistress of the Prince of Tuscany, who, in order to gratify his wish of having an heir, feigned herself pregnant, and, at the expected period, introduced the child of another as her own. And in more modern times, Joanna Southcott, at the age of sixty-five, declared herself pregnant, and was believed by her followers in England—nay more, she even found medical men who attested to it, although she stated, at the same time, that she was a virgin. Her death, however, occurred previous to the expected delivery, and, on dissection, no traces of pregnancy could be discovered.[||]

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[*] A case is mentioned by Mr. Watson, F.R.S. in the Phil. Transactions, (vol. 41, p. 711,) in whom they were discharged with pain and hæmorrhage. The female was forty-eight years old. There was no enlargement of the abdomen or of the breasts, and she attributed her symptoms to a cessation of the menses. The hydatids were united like a cluster of grapes, to a spongy substance.

[†] American Med. and Phil. Register, 4, p. 519. See also New-York Med. and Phys. Journal, vol. 1, p. 151. *Case by W. Moore. M.D.*—Several cases of hydatids of the placenta are also mentioned in a most valuable medico-legal essay, entitled "A vindication of the opinions delivered in evidence by the medical witnesses for the crown, on a late trial for murder at Lancaster." Liverpool, 1808.—I shall notice it at length hereafter.

[‡] Foderè, 1, p. 478. This author suggested, that if water be contained in the uterus, by raising it on the point of the finger, a fluctuation more or less distinct will be perceived.

[§] Burns, p. 82. Denman, p. 148.

[||] Edinburgh Review, No. 48, Art. 11. In the stormy period that preceded the abdication of James II. it seems to have been a favourite opinion among the protestants, that the Pretender (as he is now styled in history) was a suppositious child. The proofs in favour of this may be found in Burnett's History of his Own Times, The laws on the punishment for concealed pregnancy will be introduced with most propriety in the chapter on Infanticide.

III. *Of Superfœtation.*

By superfœtation is understood a conception succeeding to one that has already taken place—or that a woman, who has advanced to any period of one pregnancy, is capable of conceiving another child.

This doctrine was very current among the ancient physicians,* and it still has adherents, although the majority of the medical profession at the present day are sceptics with respect to it. Its bearing in legal medicine is on the question of legitimacy, as I shall hereafter show.

It will conduce to a better understanding of the subject, if the cases which are deemed instances of superfœtation be first stated; and, afterwards, the objections to them, and the mode in which the opponents of this doctrine explain their peculiarities.

The following is taken from the *Consilia* of Zacchias. J. N. Sobrejus lost his life in a quarrel, leaving his wife pregnant. Eight months after his death, she was delivered of a deformed child, which died in the birth. Her abdomen remained large, and it was suspected that a second infant was contained in it, but all efforts to procure its delivery proved fruitless. One month and a day thereafter, the widow was again taken in labour, and brought forth a perfect living child. The relations of the husband contested its legitimacy, on the ground that it was the fruit of a superfœtation, and Zacchias was consulted on the subject. He agreed that the two infants could not have been the product of one conception, since the interval between their birth was so great; but advanced it as his opinion, that the *first* was the product of a superfœtation, and conceived a month after the other. This he strengthened by the fact, that the husband died suddenly while in a state of perfect health. His opinion preserved the character of the mother, and also gave her those legal rights to which her situation entitled her.†

A case mentioned by Buffon has been often quoted by the enemies and advocates of superfœtation. "A female at Charleston, in South Carolina, was delivered, in 1714, of twins, within a very short time of each other. One was found to be black and the other white. This variety of colour led to an investigation, and the female confessed, that on a particular day, immediately after her husband had left his bed, a negro entered her room, and, by threatening to murder her if she did not consent, had connexion with her."‡

The remainder of the instances that I shall state, are of modern date;

London, 1758, vol. 1, p. 473, 524. And the whole testimony in favour and against the opinion, is collected in Howell's State Trials, vol. 12, p. 123.

* So common was the belief in it, that Brassavolus observes that he has seen superfœtation epidemic!!

† Zacchias Consilia, No. 66. Foderè observes, that he is assured, that a female in Turin, in 1797, was successively delivered of three children, at an interval of fifteen days between each. Foderè, 1, p. 484.

‡ Foderè, 1, p. 482.

and the following, from Dr. Moseley, may be introduced in this place, from its similarity to the preceding. He observes, that it occurred within his time at Shortwood Estate, in the island of Jamaica. "A negro-woman brought forth two children at a birth, both of a size, *one of which was a negro and the other a mulatto.* On being interrogated upon the occasion of their dissimilitude, she said, she perfectly well knew the cause of it, which was, that a white man belonging to the state came to her hut one morning, before she was up, and she suffered his embraces, almost instantly after her black husband had quitted her."[*]

Dr. Denman, in his work on Midwifery, quotes a letter addressed to the Lady of Sir Walter Farquahar, by the patient herself, which contains a case belonging to the subject before us. The female went to the ninth month of pregnancy; but, between the fifth and sixth, she met with a great fright, which affected her severely, and diminished her size. On the 11th of February, she was delivered of a healthy child, but continued in pain; and it was not until the morning of the 20th, that she was relieved. "On that day, there was born the head and parts of a child that had just the appearance of a miscarriage of four months."[†]

Dr. Maton has lately published the following, as a case of superfœtation. Mrs. T——, an Italian lady, but married to an Englishman, who was attached to the commissariat of the British army in Sicily, was delivered on the 12th of Nov. 1807, of a male child, which had every appearance of health. It was brought forth under circumstances very distressing to the parents, being dropt in a bundle of straw at midnight, in an uninhabited room, and it survived nine days only. On the 2d of Feb. 1808, (not quite three calendar months from the preceding *accouchement,*) Mrs. T. was delivered of another male infant, completely formed, and apperently in good health. He was sent away to be nursed, but the nurse's milk being deficient, he was removed soon after to another foster-mother. When about three months old, however, he fell a victim to the measles, and died. From Nov. 1807, to

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[*] Moseley on Tropical Diseases, &c. p. 111. A case by M. de Bouillon, exactly resembling the above, is quoted in a late journal. A negress was delivered of two male children, full grown, and of the same proportions; but the one was a negro and the other a mulatto. The mother confessed that she had connection the same evening with a white and a negro. Quoted from the Bulletin de la Facultè et de la Société de Medicine, 1821, in the Quarterly Journal of Foreign Medicine and Surgery, vol. 3, p. 350.

[†] Francis' Denman, p. 555. Cases resembling the above are mentioned in many of the periodical journals of the present day. See London Med. and Phys. Journal, vol. 22, p. 47; and vol. 24, p. 232. In one of these instances, (case by Mr. Fawell,) a healthy child was first expelled, and in about four or five hours thereafter, a dead fœtus, of the size of a five months' conception. In the other, (case by Mr. Rolfe,) the dead fœtus, apparently of six months, was first delivered, and the full-grown child shortly after. The Medico-Chirurg. Transactions, vol. 9, p. 124, contain a case, by Mr. Chapman, where a blighted fœtus and placenta were expelled at seven months, and a living child remained to the full period of utero-gestation. See also Phil. Transactions, vol. 60, p. 458, (case by Mr. Warner;) and the Eclectic Repertory, vol. 9, p. 531. *Dr. Mease on "Cases of Blighted Fœtus."*

Feb. 1808, Mrs. T. had not left Palermo, except on short excursions in her own carriage, and her husband had been constantly with her, since the year 1805. He communicated this narrative to Dr. Maton, with a certificate pledging himself to its truth.*

The last instance I shall mention, is one communicated to Foderé by Dr. Desgranges, of Lyons, and it is certainly a very extraordinary one.

The wife of Raymond Villard, of Lyons, married at the age of twenty-two, and became pregnant five years thereafter, but had an abortion at the seventh month, on the 20th May, 1779. She conceived again within a month, and on the 20th of January, 1780, eight months after her delivery, and seven months from her second conception, she brought forth a living child. This delivery was not, however, accompanied with the usual symptoms—no milk appeared—the lochia were wanting, and the abdomen did not diminish in size. It was accordingly found necessary to procure a nurse for the child.

Two surgeons visited the female, and were at a loss with respect to her situation. They called Dr. Desgranges in consultation, who declared that she had a second child in her womb. Although this was strongly doubted, yet three weeks after her delivery, she felt the motion of the fœtus, and, on the 6th of July, 1780, (five months and sixteen days after the first birth,) she was again delivered of another living daughter. The milk now appeared, and she was enabled to nurse her offspring.

It is not possible, adds Dr. Desgranges, that this second child could have been conceived after the delivery of the first. "Car le mari ne lui avait renouvelé ses caresses que vingt jours après, ce qui n' aurait donné au second enfant que quatre mois vingt-sept jours."

The narrative of this case was accompanied with a legal attestation of it under the oath of the mother, and, on the 19th of Jan. 1782, both children were still living.†

These instances will give a full idea of what is understood by superfœtation in the human species. The advocates for this doctrine consider them as conclusive testimony, while the opponents explain their peculiarities in various ways, and also endeavour to prove, that this kind of conception is impossible.

In the first place, it is urged, that shortly after conception, the os tincæ, as well as the internal apertures of the fallopian tubes, are closed by the deposition of a thick tenacious mucus. The membrana decidua is also formed early, and lines the uterus, and thus co-operates with the mucus, in obliterating the openings into its cavity.‡

When the gravid uterus enlarges, the fallopian tubes lie parallel to its sides, instead of running in a transverse direction to the ovaria, as in the unimpregnated state. If, then, an embryo be generated, the tubes could not embrace the ovum, and it would remain in the ovarium, or fall into the abdomen, and thus constitute an extra uterine conception.

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* Transactions of the College of Physicians, London, vol. 4, p. 161.

† Foderé, vol. 1, p. 484—5—6.

‡ The advocates of superfœtation deny that this mucus closes the os tincæ completely; and they conceive that the absorption of new fecundating matter through it is possible, Capuron, p. 110. Foderé, 1, p. 488.

But again, it is said, that even if we allow the practicability of the new embryo reaching the uterus, its arrival would be destructive to the fœtus already present. The functions which have already been performed for the first conception, have now to be repeated, and an additional decidua and placenta are to be formed.

These are, briefly, the arguments urged against the possibility of superfœtation. An appeal, however, is made to cases, where, as we have already stated, two or more children, of different sizes, and *apparently of different ages,* are born, nearly at the same time, or at a longer interval.

It will be observed, that, in one class of instances, the lesser child is represented as dead and decayed, and its size is much smaller than the accompanying birth. Now, in these, it is suggested, that twins have been conceived, and that the embarrassed situation of one child in the uterus may have prevented its developement, checked its nutrition, and thus caused its death. The other, on the contrary, lives and grows, presses on the dead one, which becomes flattened, or wholly or partly putrefied; and, in this condition, both may be expelled at the same time, or one may be detained for some time after the other.*

The South-Carolina case, however, mentioned by Buffon, is much relied upon; and, although it has been objected that the product should have been a white and a mulatto, and that hence the narrative is evidently false, yet the case of Dr. Moseley certainly meets the difficulty in a conclusive manner. But these cases are not, in my view, calculated to aid the doctrine of superfœtation. They are examples of contemporaneous conception, as is evidently shown by the circumstances attendant on each.†

I do not pretend to explain the cases related by Drs. Maton and Desgranges. The last, particularly, appears to be one of the strongest yet adduced in favour of the opinion; and its credibility would seem to be established, from the character of the reporter, and the publicity attending it.‡

It was formerly a subject of discussion within what time, after a fruitful conception, a second one could occur. The most received opinion limited it to the two first months of pregnancy—as after that period the developement of the fœtus and uterus would probably prevent it. Zacchias, however, declares in favour of extending this term to sixty days.§

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* Francis' Denman, p. 555.

† In noticing the objections agains this doctrine, I have made a free use of Professor Chapman's able essay on it in the Eclectic Repertory, vol. 1. p. 369.

‡ Dr. Granville considers, that, in the case of Dr. Maton, there were twins, whose ova were distinct and separate; and that the one first expelled, had probably not arrived at its full growth.

§ Vol. 1, p. 102, (Lib. 1. Tit. 3, Quest. 4.) Foderè abandons this, after receiving the case of Desgranges—since the super-conception must have been at the sixth month, even allowing the second birth to have been only a seventh month's child.

If we deny the possibility of this occurrence according to the prevalent opinion of the present day, it has still been suggested, that the circumstance may happen in those rare instances where the female has a double uterus. "Haller, in his Opuscula Pathologica, relates the case of a lady, in whom was found, after death, a double uterus and vagina; and he is of opinion, that women, thus formed, might be liable to a subsequent conception. Purcell gives an account in the Philosophical Transactions of a similar case, and expresses the same conviction;[*] and Lobstein, professor at Strasburg, tells us, in the London Medical and Physical Journal, that he actually delivered a woman of two children, one a month after the other, and was able to convince himself, that this was owing to her having two uteri, to each of which there was a distinct vagina."[†]

Should the doctrine of superfœtation ever be pleaded in medico-legal cases, we must be guided by the laws of legitimacy, both as to premature and to protracted births. The latest born should fall within the legal term, or be excluded from the privileges attendant on it. And this is more particularly necessary, from the obscurity that invests the subject.

4. *Of some medico-legal questions connected with this subject.*

Two questions relating to pregnancy have been suggested, which deserves some notice.

1. *Can a woman become pregnant, and be ignorant of it until the time of labour?* I cannot better preface an examination of this, than by observing, that with women, certain appearances are often referred to the cause from which they wish them to originate. Thus, married females attribute their indisposition and ailments to the presence of pregnancy; while those who, from being unmarried, and enjoying guilty pleasure, dislike that idea, charge any alteration that may occur, to disease. Of this nature is the case related by Mauriceau, where a female, who had been secretly married, took every precaution to avoid pregnancy, and not only deceived herself, but also an old physician, who prescribed for her, as having a schirrous womb, until the night before her delivery. In another instance, a female, aged thirty-five, who had made the most solemn vows of chastity, deceived many physicians, who treated her for dropsy of the womb.[‡] Foderè himself

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[*] Vol. 64, p. 474. Mr. Pole also found a double uterus in a new-born infant. Memoirs Med. Soc. London, vol. 4, p. 221. "The human uterus," says Dr. William Hunter, "in the unimpregnated state, commonly has one triangular cavity. In many instances it is found subdivided at its upper part, into two lateral cavities, so as to resemble the two horns of the uterus in a quadruped. *Several specimens of such uteri are preserved in my collection.*" Hunter's Anatomy of the Human Gravid Uterus. London. 1794, p. 6. I am indebted for this reference to my colleague, Professor Willoughby.

[†] Chapman, vol. 1, p. 370. Metzger, however, and his editor, who are strenuous opponents of this doctrine, deny the possibility of even this occurring. "L'uterus double avec un seul vagin, me paroit peu propre à heberger un fœtus: d'un cote, ou de l'autre, mais si la gaine est double egalement, les deux vagins sont trop etroits pour la reception du membre viril." (Page 488.)

[‡] Mauriceau, vol. 2, p. 205.

relates an instance which happened to an acquaintance, who was sent for to a nun labouring under a violent colic, and who continued to deny her being with child, until the cries of the infant silenced her.*

We may smile at these narratives; but the subject assumes a grave importance, when the question is asked judicially. A case in which it was made the matter of investigation, is related in the *Causes Célèbres*, and an abstract of it may prove useful.

In 1770, a female aged twenty-five, and named Louisa Bunel, residing in the bishopric of Avranches, in France, was seduced, and became pregnant. It was in the month of August, when field-labour is the most severe, that she experienced a cessation of the menses. She attributed this to the fatigue she had undergone; and feigning ignorance of her situation, declared herself dropsical. She applied to several monks for medical aid, and took diuretics, but without effect. Finally, at the sixth month, she married, but not to her seducer; and after that repeatedly took an infusion of savin in wine. At the end of three months, being alone, she was delivered of a child, which she afterwards declared was born dead, and which she covered with linen, carried to a neighbouring field, and put it under some leaves. Eight days after a dog discovered the body, and brought some rags from it to the house of a neighbour. Judicial search was now made. Louisa was discovered to be the mother, and was condemned to death for committing infanticide. Her plea was, 1. That she was perfectly ignorant of her pregnancy; and that the remedies she had taken were solely with a view to remove her supposed dropsy. 2. That the child was born dead; and, 3. That at the time of delivery, she was so extremely weak for four hours, that she could not call for assistance; and, on reviving, preferred burying her shame, since it was useless to expose herself by showing a dead child. An appeal was made to the superior court at Bayeux, who, after taking the opinion of sixteen physicians at Paris on the case, reversed the sentence of the 11th of November, 1772, and discharged the prisoner.†

The case, in the opinion of these physicians, turned on the following points:—1. Could the accused be ignorant of her pregnancy, and confound it with another complaint? 2. Could she innocently make use of the remedies that she confessed she had taken? and, 3. Is it certain that the child was born dead; and, if so, what occasioned its death? The two first only relate to our subject, as the third belongs to infanticide. Our medical judges answered both in the affirmative, on the ground of the uncertainty of the signs of pregnancy, and the ease with which it might be confounded with other diseases. They adduced, in favour of this, the authority of Astruc, Zacchias, Senac, and Hebenstreit. This last observes, that a female might be impregnated when intoxicated, and might go to the full time without knowing it; and, on being seized with pain, might mistake it for colic or painful menstruation.‡

Foderè, in remarking on this case, very justly observes, that although instances have occasionally occurred where married women have mistaken their situation, yet the sex generally ridicule the idea of this pretended ignorance. And in those which usually will come before a court of justice, the reply to such a plea should be—*Have you not exposed yourself to become pregnant; and, on what account, then, were you so confident of the usual consequences not following it?*

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* Foderè, 1, p. 491. † Foderè, p. 491, quoted from the *Causes Célèbres*.

‡ Hebenstreit, p. 286. There appears to me to be an intentional misrepresen-

The following are laid down by our author, and I think correctly, as the only cases in which ignorance is possible.

Where the female is an idiot. An instance of this kind occurred to Dr. Desgranges, in a young woman in France, who having been long tempted, was at last prevailed on to have connexion in the bath, as this, it was stated, would prevent conception. In a short time, however, the menses ceased. She became alarmed for her health, and consulted several physicians, who administered medicines; and, in this state, she continued without suspicion until the approach of labour. Dr. Desgranges states it as his opinion, that the assurances of her lover had banished all ideas of the possibility of pregnancy. The female made this assertion herself to him, and her conduct previous to delivery was calculated to strengthen it, as there were no attempts to conceal herself.*

Where a female has conceived when in a state of stupor, either from spirituous liquors or narcotics, or when in a state of coma or asphyxia. A virtuous young woman was thus violated at Lyons, during the period when the horrors of the French revolution were at their height. A powerful dose of opium was administered, the crime was completed, and in a short time she found herself pregnant, without knowing by whom.

In all other cases, the female may indeed entertain doubts concerning her situation; but doubt pre-supposes something to be suspected, while ignorance is not aware of any thing.

2. *Can a female become impregnated during sleep without her knowledge?* This question has already been incidentally noticed, and it is not necessary to enlarge on it in this place. In females habituated to sexual connection, or where sleep is unnaturally produced, there is no doubt of its occurring—whereas, in the opposite cases, the probability is greatly lessened. Authors, in remarking on this question, run into copious disquisitions on what is necessary to cause conception; but, on this, I have already intimated an opinion, which it is not necessary to repeat.†

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tation of our author in this instance. He evidently only refers to an extreme case. On the main question he observes, "His amen non obstantibus, et quamvis vera, nec ex catameniorum defectu, nec ex tumore abdominis, aut lactis in mammis presentia, de graviditate convictio nasci possit, impossibile tamen est, gravididam, quæ vegetum, fortemve embryonem, et talem qui ad usque partus legitimum terminum sine morbo pervenit, matrice tulit, motus istos magnos, qui prope finem sanæ et commodæ graviditatis sunt, non percepisse."—Page 885.

* This and the succeeding case were communicated to Foderè by Dr. Desgranges. Foderè, I, p. 496, 497.

† The following case may be added to those already related. A pregnant female, in her last moments, solemnly declared, that, to her knowledge, she never had con-

CHAPTER VII.

DELIVERY.

Part I.—1. Signs of delivery—period within which the examination should be made. Concealed delivery. Pretended delivery—modes in which it may present itself. Appearances on dissection indicative of a recent delivery. Corpora lutea—Their value as a proof of impregnation. Medico-legal cases.—2. Possibility of delivery without the female being conscious of it. Whether a female, if alone and unassisted, can prevent her child from perishing after delivery.

Part II.—1. Signs of the death of the child, before and during delivery.—2. Signs of the maturity or immaturity of the child—its appearance, size, length, and weight at various periods during pregnancy. Weight of infants born at the full time—length. Characters which mark the maturity of the child—3. The state necessary to enable the new-born infant to inherit—its capability of living—the time when it is generally deemed capable. Laws of various countries as to what constitutes life in the infant, and thus enables it to inherit—Roman, French, English, and Scotch laws. Medico-legal cases. Infants extracted by the cæsarean operation—their capability of inheriting. Laws on this subject. How far deformity incapacitates from inheriting. Monsters. Laws on this subject.

Delivery may be considered, 1, as it respects the mother, and 2, as it respects the child. We shall, accordingly, divide the chapter into two parts. And with respect to the mother we shall notice,

1. Concealed and pretended delivery.
2. Some medico-legal questions connected with the subject.

The second part will comprise a view of,

1. The signs of the death of the child before or during delivery.
2. The signs of maturity or immaturity; and
3. The state necessary to enable the new-born infant to inherit.

Part I.

1. *Of concealed or pretended delivery.*

Delivery, whether concealed or pretended, can alone be elucidated by referring to its real signs; and it will therefore be proper to commence with a notice of them.

If the female be examined within three or four days after the occur-

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nexion; but that a person in the family, some time previous, had given her some wine to drink, after which she fell into a profound sleep. She was not, however, conscious of any thing having occurred during that state; but mentioned the circumstance, as probably explaining her situation.—Mierius in Brendel, p. 99.

fence of delivery, the following circumstances will generally be observed: Greater or less weakness, a slight paleness of the face, the eye a little sunken, and surrounded by a purplish or dark-brown coloured ring, and a whiteness of the skin, like a person convalescing from disease. The belly is soft, the skin of the abdomen is lax, lies in folds, and is traversed in various directions with shining reddish and whitish lines, which especially extend from the groins and pubis to the navel. These lines have sometimes been termed *lineæ albicantes*, and are particularly observed near the umbilical region, where the abdomen has experienced the greatest distention, the breasts become tumid and hard, and on pressure emit a fluid, which at first is serous, and afterwards gradually becomes whiter, and the presence of this secretion is generally accompanied with a full pulse, and soft skin, covered with a moisture of a peculiar and somewhat acid odour. The areolæ round the nipples are dark-coloured.* The external genital organs and vagina are dilated and tumified throughout the whole of their extent, from the pressure of the fœtus. The uterus may be felt through the abdominal parietes, voluminous, firm, and globular, and rising nearly as high as the umbilicus. Its orifice is soft and tumid, and dilated so as to admit two or more fingers. The fourchette or anterior margin of the perinæum is sometimes torn, or it is lax, and appears to have suffered considerable distention. A discharge, (termed the lochial) commences from the uterus, which is distinguished from the menses, by its paler colour, its peculiar and well-known smell, and its duration. The lochia are at first of a red colour, and gradually become lighter until they cease.†

These are the signs enumerated by the best writers on the subject, and where they are all present, no doubt can be entertained that delivery has taken place. Several of them, however, require further notice, for the purpose of indicating the mistakes which observers may experience concerning them. 1. The lochial discharge might be mistaken for menstruation, or fluor albus, were it not for its peculiar smell, and this it has been found impossible, by any artifice, to destroy. 2. The soft parts are frequently relaxed as much from menstruation, as from delivery; but, in these cases, the os uteri and vagina are not so much tumified, nor is there that tenderness and swelling. And again, when all signs of contusion disappear after delivery, the female parts are found pale and flabby. This circumstance does not follow menstruation. 3. The presence of milk. This must be an uncertain sign, for the reasons stated in the chapter on Pregnancy.‡ "*It is impossible for this secretion to take place independently of pregnancy.*"§—The most unequivocal form in which it can appear, is when the breasts are tense and painful, and filled with the fluid, of its usual nature—nor serous or watery, as is observed in pretended cases. It is also to be remarked, that this secretion goes on during the presence of the lochia; while, on the contrary, the breasts become flaccid and almost empty, if the menses supervene, and fill again when they disappear.*—Should, therefore, a case occur where doubt is entertained, it would be proper to notice the state of the breasts while the discharge (of whatever nature it may be) is present. 4. The wrinkles and relaxation of the abdomen which follow delivery, may be the consequence of dropsy, or of lankless following great obesity. This state of the parts is also seldom very striking after the birth of a first child, as they shortly resume their original state. 5. The lineæ albicantes will often remain for life, and hence should not be depended upon in cases where females have had several children.

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* Dr. Stringham, in his lectures on legal medicine, observed, concerning this sign, that it is an invariable one in pregnancy. "It does not take place when milk is secreted from any other cause."—Beck on Infanticide, p. 45.

† Foderé, vol. 2, sec. 1. Mahon, vol. 1, p. 166 to 170. Capuron, p. 124. Hutchinson on Infanticide, p. 90. Burns, p. 326.

‡ Page 110. See the cases there related.

§ Burns' Midwifery, p. 326.

It is hence the duty of the medical examiner to view all the signs enumerated in connexion; and where all or most of them are present, it is his duty to declare that they are the consequence of SEXUAL CONNEXION. So far he can pronounce with safety. But if the question has a bearing on the charge of infanticide, the existence of the child should be proved. I make this remark out of its place, but it cannot be too often repeated in a treatise on legal medicine. To prevent mistakes, inquiry should also be made, whether the individual has laboured under dropsy, menorrhagia, or fluor albus; or whether any external violence has been applied to the genital organs.

The next subject of enquiry is, *within what time should this examination be made?*

An astonishing difference occurs among females, in the period of recovering from the effects of delivery. Some have been known to proceed to their occupation on the day that the child is born, while others remain enfeebled for weeks. Much in this respect depends on the constitution and habits of life. There is, however, a term in all, when the signs of delivery disappear, and the parts return to their natural state; and a general rule ought to be established in legal medicine, beyond which an examination should be deemed inconclusive and void. A majority of writers have fixed on the term of eight or ten days for this purpose; and it is probably a correct one. After that period, the signs become equivocal and may lead to error, particularly if the delivery has been natural.†

Zacchias remarks expressly, that the proofs of delivery become uncertain after the tenth day; and this uncertainty increases until the fortieth, when the abdomen, with the exception of the white lines, returns to its natural state, particularly if the female be healthy

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* Foderè, 2, p. 15.

† Farr (p. 60 and 61,) enumerates certain signs that a woman has *formerly* been delivered of a child, which it may be proper to mention. The loss of all the signs of virginity. The orifice of the uterus wanting its conical figure, and its lips unequal. An expanded and pensile abdomen. The lineæ albucantes. The frœnum of the labia obliterated: the breasts flaccid and pendulous; the nipples prominent, and the areolæ of a brown colour.

Michael Alberti, a celebrated professor of his day, and Bohn, professor at Leipsic, both recommend the visit to be made within the week; and, in a case before the parliament of Paris, in 1767, Petit and Louis reported in favour of acquitting a female suspected of infanticide, on the ground that the investigation had been made at too late a period.[*] The following case, which came before the criminal court of the department of the Seine in 1809, presents a most striking instance, in which the delay alone seems to have prevented the detection of the crime.

On the 11th of June, 1809, a female named Aimée Perdriat, went to the house of a friend called Rosine, who resided in the fifth story of a house in Paris. She requested leave to remain, as she felt ill with a headache and a violent cholic. Shortly after her being shown to a room, a lodger in the third story heard a noise in the water-pipe, as if a heavy body passed through it. She was not visited by any one, except Rosine and another female, for the purpose of enquiring whether she wanted any thing. About five hours after the arrival of Aimée, Rosine observed blood on the stairs and on the floor of the chamber: and Aimée remarked that her menses flowed very profusely.

Suspicions appear to have been excited; and, on the 17th, the privy was searched. A fœtus, placenta, and bloody cloths were found; and two surgeons, who examined the body, deposed that no marks of violence were present, except that the umbilical cord was torn off; that it was a full-grown child; and that, from their experiments, it certainly had breathed after birth; and there were proofs of this having continued even in the filthy place from which it was drawn.

She was arrested on the suspicion of having been the mother of this child; and the suspicion was fortified by a previous refusal to admit the examination of a midwife. On the 15th, 17th, and 27th of July, being more than a month after the supposed delivery, she was examined by Baudelocque, Dubois, Ané, Dupuytren, and Lafarge. They unanimously declared, that there was no sign present which indicated the delivery of the female at the time in question. She was accordingly acquitted.[†]

It is imposible, I conceive, to reflect on this case, without coming to the conclusion, that this woman was guilty. But, if the physical signs of the crime are so slowly attended to, judges are certainly justified in leaning to the side of mercy.[‡]

Delivery is most commonly CONCEALED under the idea of destroying the offspring immediately after birth. In suspected cases, therefore, the examining physician should attend, 1. To the proofs of previous pregnancy. On these I have already dilated; and will only add, that ordinarily no investigation has taken place at the time when this was advancing. Circumstantial evidence is not to be trusted; but it is proper to enquire whether an enlargement of the abdomen has been observed—whether this was connected with any apparent disease, and whether any precautions as to dress were used to conceal it. 2. The proofs of recent delivery; and 3. To the connection between the supposed period of parturition, and the state of the child that is found. An infant recently born, is indicated by the redness of the skin, and by the attachment of the umbilical cord to the navel; and the female, if the mother, will be found to have the marks of a late delivery on her. The question, whether it was living after birth, belongs to infanticide.*

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[*] Foderè, 1, p. 17. "Hæc primis post partum diebus a medicis dijudicari possunt, si vero suspicio tardius oriatur, nec in matre, nec in infante, signa rei recte definiendæ supersunt."—Ludwig, p. 44.

[†] Foderè, 2, p. 18.

[‡] A case of an opposite nature, where the female was evidently accused wrongfully, with the reasoning of Zacchias in her favour, is contained in his *Consilia*, No. 69. There was no milk present—the breasts flaccid—no lochial odour—the parts very slightly tumefied, and her strength not affected. He deemed it nothing more than a profuse menstruation, following a retention which had caused the enlargement of the abdomen.

In PRETENDED DELIVERY, the female declares herself a mother, without being so in reality. This is not so revolting to our feelings as the former; but it is, notwithstanding, improper, and should be guarded against. Its most common origin is cupidity, or a weak desire to produce an heir to large estates; and hence, we hear most of it in Europe, where property is entailed, and families anxiously desire the birth of a son to perpetuate their honours.

In France, pretended delivery was formerly punished with infamy and banishment. In 1772, a female in Paris, who was sterile, resolved to gain the favor of her husband by pretending pregnancy, and, at the end of the proper period, obtained an infant from one of the hospitals. She effected this by the aid of a midwife, who attended during the assumed labour. Unfortunately, however, the parents of the child repented of having put it in the hospital, and endeavoured again to obtain it. Failing in this, they took steps to discover where it was; and, ascertaining it, a full disclosure took place. The woman was sentenced to make the *amende honorable*, with a writing on her breasts, containing these words: "A woman who stole a child, in order to pretend being a mother," and was afterwards banished during her life from Paris. The midwife bore a similar writing, which purported that she was one who, abusing her station, had assisted and favoured the pretending of maternity, and she was condemned to perpetual imprisonment. The parliament, however, on an appeal, lightened the punishment, and ordered her to be admonished and fined.*

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* A case worthy of record occurred lately in the north of Scotland. A fœtus was found in a sink, and notice of the occurrence was immediately given to the clergyman of the parish, just as he was going to church. The worthy pastor was aware that a very few days delay might render all inquiry fruitless; so, at the conclusion of the service, he informed the congregation of what had happened, adding, that as the child was found within the bounds of the parish, an imputation would necessarily lie against the young women of the parish, and jealousies, doubts, and suspicions would arise, to the total subversion of christian charity, and good neighbourhood, throughout his cure; and inviting all the young women who wished to maintain their reputation, to exhibit themselves next morning before the Kirk Session. Accordingly, on the following day, the minister and elders, with a midwife and the village surgeon as assessors, held a grand *reconnaisance*, by means of which the unfortunate mother was detected. She was found guilty of concealment of pregnancy.—EDITOR.

The penal code now in force in France, (sect. 345) prescribes imprisonment as the punishment for concealing an infant—for substituting one child for another, and for pretending that a child has been born.†

Pretended delivery may present itself under three points of view. 1. *Where the female, who feigns, has never been pregnant.* This, if thoroughly investigated, may always be detected. There are signs, which must be present, and cannot be feigned. An enlargement of the orifice of the uterus, and a tumefaction of the organs of generation, should always be present; and if wanting, are conclusive against the fact. Dr. Male mentions a case which happened to a surgeon in Birmingham not long since. "Being called to a pretended labour, a dead child was presented to him; but there was no placenta. He proceeded immediately to examine the woman, and found the os tincæ in its natural state, nearly closed, and the vagina so much contracted as not to admit the hand. Astonished at this appearance, he went to consult a medical friend; but, before any further steps were taken, it was discovered that he had been imposed upon. The woman, in fact, had never been pregnant; and the dead child was the borrowed offspring of another. She was induced to practise the artifice, to appease the wrath of her husband, who frequently reproached her for her sterility.‡

2. *Where the pretended pregnancy and delivery have been preceded by one or more deliveries.* The facility of counterfeiting in this case is certainly greater than the former, particularly if the examination be not made within eight or ten days. Attention should be given to the following circumstances: The mystery (if any) that has been affected respecting the situation of the female—her age, and particularly whether she has been previously barren; and the condition of the husband, whether aged or decrepid. All these would be corroborating evidence against the actual occurrence of delivery.

3. *Where the female has been actually delivered, and substitutes a living for a dead child.* This cannot be elucidated by physical proof, unless some persons have been present at the delivery. And in this, as well as in the former case, a strict examination should be instituted, of the witnesses who have attended. Zacchias and Mahon § lay considerable stress on the resemblance that may exist between the parent and child: but this is of little value.

It sometimes happens, that the female dies shortly after the supposed or pretended labour; and it is necessary to examine the body, in order to ascertain the truth. The appearances that are considered to indicate delivery, are the following:—"The uterus being found like a large flattened pouch, from nine to twelve inches long. Its cavity contains coagula or a bloody fluid, and its surface is covered by the remains of a decidua.* Often the marks of the attachment of the placenta are very visible; and this part is of a dark colour, so that the uterus is thought to be gangrenous by those who are not aware of the circumstance. The surface being cleaned, the sound substance of the womb is seen, and the vessels are observed to be extremely large and numerous. The fallopian tubes, round ligaments, and surface of the ovaria, are so vascular that they have a purple colour; and the spot where the ovum escaped, is more vascular than the rest of the ovarian surface. This state of the uterine appendages continues until the womb returns to its unimpregnated state.

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* Foderè, 4, p. 406, from the *Causes Célèbres*.

† Capuron, p. 18.

‡ Male, p. 212. A case of a somewhat similar nature is mentioned by Capuron, p. 110.

§ Zacchias, lib. 1, tit. 5, quest. 4; and lib. 3, tit. 2, quest. 8. Mahon 1. p. 209.

A week after delivery, the womb is as large as two fists. At the end of a fortnight, it will be found almost six inches long, generally lying obliquely to one side. The inner surface is still bloody, and covered partially with a pulpy substance, like decidua. The muscularity is distinct, and the orbicular direction of the fibres round the orifice of the tubes very evident. The substance is whitish. The intestines have not yet assumed the same order as usual, but the distended cæcum is often more prominent than the rest.

It is a month at least before the uterus returns to its natural state: but the os uteri rarely, if ever, closes to the same degree as in the virgin state."†

To these it has been customary to add, with great confidence, the presence of a *corpus luteum* in the ovarium. As we shall have frequent occasion to refer to this peculiar body, it may be proper briefly to describe what is understood by it. The corpora lutea are oblong glandular bodies, of a dusky yellow colour. In the early stages of pregnancy, and for some time after delivery, they are extremely vascular, except at their centre, which is whitish; and in the middle of this white part is a cavity, from which the impregnated ovum is supposed to have proceeded. They gradually fade and wither: but there is no regularity as to the time of their disappearance.‡

From the experiments of De Graaf and Haighton,§ it seemed to be decidedly established, that their existence was a certain indication of previous impregnation; and such was the general belief of the profession. The causes of a more minute investigation on this point, and of the invalidation of this proof, will be best understood by the introduction of an important medico-legal case. I make no apology for its length, since it reviews, as it were, all that we have stated on the subject of delivery, and points out the difficulties that may occur in judicial investigations.

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* The decidua is sometimes produced in cases of difficult menstruation.

† Burns' Midwifery, p. 326. ‡ Burns and Denman.

§ Phil. Transactions, vol. 87, p. 159.

Charles Angus, Esq. of Liverpool, was, in Sept. 1808, tried at Lancaster for the murder of Miss Burns, a female residing in his house. The symptoms previous to her death, and the appearances observed on dissection, were such as to warrant a suspicion that she was poisoned. The medical examiners also found the uterine organs in such a state, as to lead them to declare, that in their opinion the deceased had been delivered a short time before her death of a fœtus, which had nearly arrived at maturity. Accordingly, on the trial, the medico-legal questions agitated were, 1. Whether Miss Burns had died from the effects of poison; and, 2. *Whether she had been delivered of a child recently before death?*[*] I shall notice the first question in its proper place, and here confine myself to the second.

The testimony respecting her situation while living, appears to be contradictory. Before the coroner, the servants swore, that for some time before her death, she had increased very much in bulk; and had the appearance of a pregnant woman. Shortly before her death, the pain in her body was so severe, that she could not put her feet to the ground, and could scarcely bear to be touched; and she was occasionally observed to hold fast with her hands by the end of a sofa, on which she sat. These pains continued during the whole of Wednesday and Thursday, but on Friday morning, (the day she died,) they had gone off; she appeared to be lighter, and was able to walk across the floor. She was also distressed during her illness with retention of urine. On the trial, the witnesses for the prosecution swore that she had every appearance of being pregnant, while those for the prisoner swore, that for twelve months before her death, she had been very poorly, and had been irregular for some years—that she had a great difficulty in breathing, and complained that she was much puffed and swelled, and was afraid of dropsy—that some weeks before her death, she was observed to be uncommonly flat bosomed, and not half so plump as she used to be in health, but swelled at the stomach—and that she had no appearance of being pregnant. Nothing satisfactory or conclusive can be drawn from these conflicting statements.

The appearances on dissection. The uterus was found so enlarged, as to be capable of containing nearly a quart of fluid. Before it was removed from the body, Mr. Hay, the surgeon, placed his left hand upon the fundus uteri, and introduced his right hand with the greatest ease into it, until the fingers of his right hand could be felt by those of the left through the fundus. The uterus being taken out of the body, an incision was made along its whole length, and its cavity laid open. The whole internal surface was bloody, and near the fundus there was a well-defined circular space of a deeper colour than the rest, and about four inches and a half in diameter. This space was rough and rugged, and a small fragment of what appeared to be the placenta, still adhered to it; and the blood-vessels opening upon it, were distinctly visible, and as large as a crow-quill, whilst every other part of the internal surface was smooth. The walls of the uterus were about half-an-inch in thickness. There was no coagulum in it. The os uteri remained in so dilated a state, that the four fingers of a hand, drawn together in the form of a cone, would pass through without in the slightest degree distending it. *Vagina ipsa admodum dilatata. Labia ejus fuerunt livida, et undique sanguine fœdata.*

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[*] Mr. Angus was indicted on two counts—1. For poisoning Miss Burns; and, 2. For administering poison, in order to procure an abortion.

The medical witnesses for the crown, (Drs. Gerard, Rutter, and Bostock, and Mr. Hay,) considered these appearances as conclusive in favour of her recent delivery; and they remark, that the enlargement of the uterine vessels within the boundaries of the placental mark, and the mark itself, were to them decisive—that mere enlargement of the cavity of the uterus, and dilatation of the os uteri, and even hæmorrhage, might have been occasioned by other causes than pregnancy, as by dropsy; but no form of dropsy would occasion that mark, and no dropsy would explain the extraordinary enlargement and dilatation of the uterine vessels within that mark.

On the trial, however, Dr. Carson, of Liverpool, being examined as a witness, objected to the above conclusions, for several reasons. *The great dilated state of the uterus* was such, according to him, that if the mother had parted with a placenta, she must either have flooded to death, or the womb must have been gorged with coagulated blood. To this opinion, the testimony of Mr. Charles M. Clarke, lecturer on midwifery in London, to whom the uterus was shewn after trial, may be opposed. "I have seen," says he, "uteri after the death of patients lately delivered, in whom, however, there was no hæmorrhage, which have been contracted in no greater degree than the uterus which is in the possession of Mr. Hay." Besides, it is evident, that the uterus had contracted, and was not at its maximum of dilatation; for if it could not contain more than a quart of fluid, it certainly could not, in that state, have contained a fœtus with its placenta and membranes.

Dr. Carson next intimated, that the appearances which were supposed to indicate the recent expulsion of a fœtus, might be explained, on the supposition that *dropsy of the hydatids* was the disease under which Miss Burns laboured. These hydatids, he observed, are attached by pediculi to the internal surface of the womb, and the action necessary to expel them, would cause a dilatation of the os uteri. He supposed, also, that the vessels nourishing the hydatids might be so much smaller than those nourishing a fœtus; that, in a state of undue dilatation, a flooding might not take place on their expulsion. When pressed with respect to the placental mark, he replied, that the attachment of these dropsical hydatids might have caused it.

I have already adverted to this subject in a previous chapter; but it is necessary to descend to some additional particulars. Hydatids originate either strictly in the uterus, or in the placenta. The last are by far the most frequent. Dr. Baillie never saw an example of hydatids of the uterus;* and Dr. Denman, although he admits their occasional occurrence, yet adds, that the other species is what is generally observed.[*] A MS. extract from notes of Dr. William Hunter's lectures on the gravid uterus, delivered in 1765, gives the most minute account of these extraordinary productions. "I have seen, (says he) a placenta in the fourth month, all degenerating into hydatids. There are two kinds; one where the little hydatids are distinct and detached; the other, where they hang together in strings, like bunches of currants. This last sort is the most common in the uterus. They are most common in the placenta, but they may be in other parts of the uterus. Sometimes there are vast heaps of them in the cavity of the uterus, and no remains of the placenta. I ventured, from seeing hydatids coming away from the uterus, to say that the woman was with child, because they most commonly attend the placenta. I have seen pails-full of hydatids come away from the uterus with pains, the placenta and fœtus being thus converted."

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* Morbid Anatomy, 3d ed. p. 376.

There is little doubt, but that hydatids generally hang together like a bunch of currants, and are united by a common peduncle or footstalk. Should, however, the reverse be considered probable, it is difficult to conceive where the hydatids could have been placed, as in this case, where the bases of the common footstalks alone extended over a space of four inches and a half in diameter. Three cases are related by Dr. Bostock, to whom they were communicated by Mr. Kendrick, surgeon, at Warrington, of the disease under consideration, and in each of them, the medium of attachment to the uterus was a placenta, about *the size of half-a-crown*. I will repeat again, in this place, what I have before remarked,[†] (at the risk of exposing my ignorance on this point,) that I can find no case on record, where *hydatids of the uterus* have been formed, *independent of sexual connexion;* and again, should there be such a case, were the parietes of the uterus increased, or the os uteri enlarged, as in this instance?

The difference of opinion that was thus expressed by the medical witnesses, not only on this question, whether Miss Burns had been recently delivered, but also on the main accusation of poisoning, led to his acquittal. But I believe few can review this case, and not come to the conclusion, that she had really been pregnant. The charge of infanticide does not appear to have been made, and of course ought not, without the previous finding of an infant; but in every thing that relates to the verifying of sexual connexion and its consequences, and which in this instance must have been criminal, the proof seems to be complete. Even hydatids, as we have sufficiently shown, are to be considered, in a vast majority of cases, as indications of impregnation. If present in this instance, they should have been produced, or at least seen, by some medical person.

It was not until after the trial, that the ovaria were examined. They were then divided in the presence of a number of physicians, and a *corpus luteum* distinctly perceived in one of them. Mr. Hay took the uterus and its appendages to London, and shewed it to the most eminent practitioners there. He received certificates from Drs. Denman and Haighton, Messrs. Henry Cline, Charles M. Clarke, Astley Cooper, and Abernethy, all stating that it exhibited appearances that could alone be explained on the idea of an advanced state of pregnancy. And it appears to have been universally allowed, that the discovery of the *corpus luteum* proved the fact beyond a doubt.*

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[*] Denman, p. 146.

[†] Page 85.

Subsequently, however, to this time, Sir Everard Home investigated the subject; and appears to have shown that the corpora lutea may be present without impregnation. He examined the ovaria of several women who had died virgins, and in whom the hymen was too perfect to admit of the possibility of impregnation; and found that there were not only distinct corpora lutea, but also small cavities round the edge of the ovarium, left by the ova that had passed out at some former period. It is, therefore, supposed that the excitement of the ovaries from passion alone, may be sufficient to rupture the vessels, and produce corpora lutea; and this is strengthened by the corpora lutea having been found in the female quadruped, after a state of periodical lasciviousness, where no copulation had taken place.†

If the theory of Sir Everard Home concerning these bodies be adopted, we must of course discard the ancient opinion. The corpora lutea, according to him, are found in the substance of the ovarium; and their use is, to form the ova. They exist previously to, and independent of, sexual intercourse; and when the ova are formed, they are destroyed by absorption, whether the contained ova are impregnated or not. He conceives, however, that impregnation is necessary to the expulsion of the ova; and that the corpus luteum is burst by extravasated blood; its cavity, after the escape of the ovum, being found distended with blood in a coagulated state.*

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* The facts from which the above case has been prepared, are drawn from a review of the trial of Mr. Angus, and the pamphlets to which it gave rise, in the Edinburgh Med. and Surg. Journal, vol. 5, p. 220; also a pamphlet entitled "A Vindication of the Opinions delivered in Evidence by the Medical Witnesses for the Crown, on a late Trial at Lancaster, for Murder—Liverpool, 1808."—This masterly production is from the pen of Dr. Bostock. The quotation from Dr. Hunter's Lectures, and the cases of Mr. Kendrick, are taken from it. I am also indebted for some hints to the London Med. and Phys. Journal, vol. 21; and the Edinburgh Annual Register, vol. 1, part 2, p. 188. I may add, in this place, that a rude, but instructive plate of hydatids, formed like bunches of currants, is contained in Stalpart, vol. 1, p. 302.

† Francis' Denman, p. 119; Smith, p. 469. A case is mentioned by Dr. Blundel, of a female that died of chorea under seventeen years of age, in whom the hymen, which nearly closed the entrance of the vagina, was unbroken; and yet, in the ovaria, there were no less than four corpora lutea. Two of them were obscure; but the others were distinct, and differed "from the corpus luteum of genuine impregnation, merely from their more diminutive size, and the less extensive vascularity of the contiguous parts of the ovarium."—Medico-Chirurg. Transactions, vol. 10, p. 268.

A recent case has, in my opinion, completely overthrown the theory, that even strong passions are necessary to the formation of the corpora lutea. My friend, Dr. Mackintosh, lecturer on midwifery, in Edinburgh, has in his museum a preparation taken from the body of a child, which he, in company with Dr. John Scott, dissected at Peirceshill Barracks. The subject was not above five years old, and the hymen of course was entire She died of tubercular disease in the lungs; yet in her ovaries were numerous corpora lutea, as distinct as I ever saw them in the adult impregnated female.—Editor.

Mr. Stanley, in a late paper in the Transactions of the College of Physicians, remarks, that the corpora lutea of virgins may in general be distinguished from those that are the consequences of impregnation, by their smaller size.†

I have endeavoured, in several parts of this chapter, to inculcate the idea, that medical examiners should, in disputed cases, limit their opinion to the fact, *whether evidences of conception are present or not.* The law is so constituted, that nothing further is required of them on this point. *An infant must be found, in order to bring the charge of infanticide;* and, in all other instances, it will be sufficient if we prove previous sexual connection, whether the product has been an organized fœtus or not. The following case is calculated to enforce the necessity of confining our opinion to this fact.

Mrs. Cunningham, aged 24, and the mother of three children, considered herself nearly four months advanced in pregnancy, when the rudeness of a licentious person required her to make a violent exertion. On the succeeding day, she perceived a slight discharge of blood from the vagina, which ceased in about twenty-four hours. A day thereafter, it returned with increase, and continued (gradually diminishing) for three days. All this time, she suffered no pain, nor was she prevented from managing her domestic affairs. There was a slight tenderness of the abdomen only. At the conclusion of the time last mentioned, she was seized with pains resembling those of parturition, and accompanied with a profuse hæmorrhage. Mr. Lemon, a surgeon, was called, and on examining *per vaginam,* he found the os uteri dilated to the extent of half-a-crown, and a bag protruding through it. A fleshy cake, three inches in diameter, possessing every character of a natural placenta, and having a membranous bag connected with it, was shortly thereafter expelled. The shape of this mass was oblong. On cutting into the bag, which was flaccid, the contents gave an appearance similar to what is presented on the exposure of the abdominal and thoracic viscera of a very young fœtus. But the expansion of the placenta rendered the nature of the appearance evident. Its whole surface was covered with tumours. There were about twenty-two distinct, besides many inconsiderable ones, of various size, shape, and colour, and some in clusters, all seemingly connected together by veins. The largest tumour was equal in magnitude to a small walnut. Some were of a livid colour, others fleshy brown, and two or three light yellow. The livid ones had generally condensed fat at the extremity; and they, as well as the brownish, contained coagulated blood.

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* Annals of Philosophy, vol. 13, p. 140; vol. 15, p. 45. Sir E. Home dissected a female who had been impregnated a week before death. The ovum was found in the uterus, enveloped in coagulated lymph. Two corpora lutea were observable, and there were several cavities from which ova had previously made their escape. The os tincæ was closed with a thick jelly; but the opening to the fallopian tubes was pervious.—Annals, 9, p. 468; and 11, p. 54.

† Trans. Col. Phys. London, vol. 6, p. 425. He also suggests a doubt, whether the effect of the excitement on the ovary of the virgin, can extend beyond the rupture of the vesicle, and the production of the corpus luteum.

The woman, during the growth of this mass in the womb, had every symptom of pregnancy—nausea, capricious appetite, enlargement of the breasts, prominent firmness of the abdomen, and a cessation of the menses. She had not, however, felt any actual motion.

Mr. Lemon remarks, that if this female had died from hæmorrhage, and her death been made a subject of legal investigation, the womb would probably have exhibited all the proofs of impregnation. Even the *placental mark* would have been present, and yet no fœtus, or umbilical cord was formed in this instance.

The observations of the editors of the journal from which this case is taken, are a satisfactory commentary on it. This mass was evidently the product of conception and impregnation. The whole catalogue of symptoms tend to prove it, and the only circumstance against it, is the absence of a fœtus and umbilical cord. "But this furnishes no conclusive argument, as there are innumerable instances of fœtuses so exceedingly imperfect, that their nature can scarcely be recognized; and, with a still more imperfect organization, they degenerate into a mass like the present."* The *placental mark*, then, in this instance, would have been a satisfactory proof of conception.

2. *Of some medico-legal questions connected with the subject of delivery.*

1. *Can a woman be delivered without being conscious of it?* This question must be answered in the negative, with, however, some exceptions. Delivery is undoubtedly, to a certain degree, independent of the will, and there may hence be certain situations in which it will take place without the female's knowledge. The administration of narcotic substances may cause such a state; as in the instance of the Countess de Saint Geran, who was plunged into a deep sleep by a narcotic beverage, and, during it, was delivered of a boy. In the morning she awoke, and found herself bathed in blood, and the infant gone. Her relations had suborned individuals to remove it, in order to deprive her of the pecuniary advantages of her situation.† There is also a class of diseases commonly called comatose, and accompanied either with or without fever, during the operation of which, delivery may take place without the female's knowledge. Hippocrates mentions a case, in a woman eight months advanced, who, on the fifth day of a typhoid fever, accompanied with coma, fell into labour, and was delivered without being conscious of it. I will only add to

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* Edinburgh Med. and Surg. Journal, vol. 1, p. 96. "Case in which a mass, resembling a placenta without a fœtus, was discharged from the womb, by M. Lemon, member of the Royal College of Surgeons, London." With observations by the editor.

† Foderè, vol. 2, p. 10, from the *Causes Célèbres*.

these, the account given by Dr. Hoyer, of Mulhausen, of a female dying in labour, who was put on the bier for interment, and, while there, an infant was suddenly born.*

These examples prove that it is possible for a women to be delivered without being conscious of it; but they at the same time prove, that if some extraordinary and striking cause do not intervene, the assertion is to be disbelieved. The early pains of pregnancy may be mistaken for those of cholic†—flooding may commence during sleep; but it is hardly credible that the whole process of labour and delivery may be gone through, by a healthy woman, and of sound mind, without her being aware of it.‡

2. *Can a woman, if alone and without assistance, prevent her child from perishing after delivery?* This is a most important question, and deserves our serious consideration, from its bearing on the subject of infanticide.

There are undoubtedly many cases, in which an unassisted female will be unable to prevent the death of her infant. Among these may be mentioned, very rapid and easy delivery. Instances of this nature occur to all accoucheurs; and Foderè relates of his own wife, that a single pain brought forth the child. Such is the conformation of the pelvis, and so powerful the action of the womb, that the membranes and fœtus are expelled together. Now a female taken thus, might be unable to prevent the child from falling, and its death would ensue, if she remained unassisted.* Such a state of the parts is, however, very uncommon in a first delivery,† and this is the one that commonly is considered in cases of infanticide. If a woman has, in a previous labour, experienced so rapid a parturition, it is her duty to guard against the consequences, when a second is impending. Another possible circumstance is, that a woman may be taken in labour and delivered while passing her fæces. The pressure of the uterus, in the latter days of pregnancy, produces an inclination of this kind, and even during labour it is very common. But delivery in this position may not only be fatal to the child, but very injurious to the mother, by tearing off the umbilical cord, or inverting the uterus. Delivery may also be attended with hæmorrhage, and consequent debility, or with fainting or convulsions, and the female be unable to assist her offspring. These are cases which do not often occur, and when they do, they leave traces sufficiently evident—paleness, swoonings, the state of the pulse, and of the infant.‡ A fourth case, is when the mother being alone, and the child having its face to the sacrum, is delivered with it downwards. In this position it cannot breathe, unless it be turned; and it is well known, that the slightest substances impeding respiration in a new-born infant, such indeed as a portion of the bed-clothes, or a piece of wet linen, will destroy it.

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* Foderé, vol. 2. p. 11, from the *Causes Célèbres*.

† While lecturing on the subject of concealment of pregnancy, in the winter of 1823-4, I received the following extraordinary case from my friend Mr. M'Intosh. "I was consulted about a married lady in the spring of 1822, who was supposed to be in a very bad state of health. She had been attended by Dr. ———, and treated for an affection of the spine and dropsy. The husband of the lady grew impatient, as she became daily worse, and the abdomen more and more distended. He sent for the family-surgeon, who suspected it might be pregnancy, attended with peculiar nervous irritability, and recommended that I should be called in to examine more particularly. Accordingly I waited on her, and as she sat on her chair the nature of the case became perfectly clear, as I distinctly perceived the motion of the fœtus. This I mentioned, but the lady scouted the idea. I warned her to get baby-linen and dresses ready, which she did not do: so convinced was she that she was not pregnant. In six weeks afterwards, I was suddenly called, and found the patient in labour; and, to demonstrate, in the clearest point of view, that she had not believed that she was in the family-way, no nurse was engaged, nor had any thing in the shape of dress been prepared for the child. I told her she was now in labour, but she would not believe me. Upon examination, I found the os uteri open, the membranes protruding, and I distinctly felt the head of the child. The waters broke, still she would not believe. The pains increased, the head of the child was born, but she would not credit her actual situation till she heard the child cry, and it was put into her arms. Both mother and child did well, and I am engaged to attend the mother a second time, in Nov. 1823.—Editor.

‡ Foderé, 2, p. 10. Capuron, p. 129.

The following case I had from Dr. Marshall. The wife of a bombardeer of artillery, while stepping out of her bed in the ninth month of her pregnancy, dropped the child on the floor; she had no warning of her approaching labour, and luckily the child was unhurt.

Another case I should be afraid to state, but that I had it from a gentleman of unquestionable veracity. The wife of an officer of a Scotch militia-regiment had long been married, without having a child. One day, while bathing her feet in her bed-room, her servant heard the cries of a child; she rushed into the room, and found her mistress lying back in her chair in a swoon, and a new-born infant struggling in the tub at her feet. She raised the child, and both it and the mother did well. In this case, neither the lady nor her husband had the slightest suspicion that she was pregnant.—Editor.

There are also some infants so weak at birth, that they require the warm-bath, rubbing with stimulant applications, &c. in order to preserve their life. An unassisted mother cannot of course save these. It has also been suggested, that the female may be suddenly delivered while in a standing posture, and the infant falling, may be found with a fractured skull. In such a case, however, we should look for a rupture of the cord, and a violent hæmorrhage, consequent on a forcing away of the placenta.§ The cord may also be wound round the neck, and thus prevent respiration.

Lastly, The infant may perish, and the mother not be able to prevent it, when the umbilical cord has not been tied after being cut, broken, or torn. The first of these, however, is such a proof of presence of mind, that we may justly be distrustful, if she denies being afterwards unable to tie it. It may be broken and torn, as we have already stated, by the weight of the infant, and the mother be unable to save it. There are, however, instances, in which the mother and the heroine are admirably combined. The wife of a goldsmith at Marseilles, was seized in labour while walking her room. The infant fell, and the cord broke. She took it up and called for assistance, but was not heard. Finding that it was losing blood by the cord, she compressed it with her fingers, and held it so for two hours, when she was found fainting. Her life, however, and that of the child, were both preserved.*

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* Dr. Hunter mentions a case, where a female was seized during the night, and the child was born before he arrived. She held herself in one posture, to prevent the child from being stifled; but, although it had cried, yet, on the arrival of Dr. Hunter, it was found dead, laying on its face, and covered with blood.

† Mahon, 2, p. 381. ‡ Mahon, vol. 2, p. 383. § Smith, p. 370.

These are the exceptions to the general doctrine that may be laid down in such cases, viz.; *That every woman is more or less acquainted with the time when she is to be in labour, and that it is her duty never to be so far alone, as to render assistance accidental.* Even during labour, the vast majority of females make known their situation by their pains, and they will only be suppressed by those in whom shame, and the fear of dishonour, are predominant passions. And it is a question of moment, whether we should feel that sympathy for this sense of shame, which some authors, and particularly Dr. William Hunter, have inculcated in their writings. It is at all events misplaced as to time; and the female who destroys a human being, and her own offspring, to escape its effects, should have felt its influence at an earlier period. "To the moral and political philosopher, Dr. Hunter may appear to have exalted the *sense of shame into the principle of virtue,* and to have mistaken the great end of penal law, which is not vengeance, but the prevention of crimes."† It is not necessary, however, to enlarge on this point. Circumstantial evidence generally guides in the preliminary decision of it, when accusations of infanticide are made; and great stress is properly laid, in disputed cases, on the incidents of time and place, and of situation and character.‡

Part II.

Delivery, as it respects the child, may become a subject of importance, both in civil and criminal cases; and instances are frequently occurring, in which the utility of properly understanding its phænomena, is clearly manifested. The arrangement proposed was to notice,

1. *The signs of the death of the child before or during delivery.*

This subject may be agitated in civil cases, where the succession to an inheritance is questioned; or in criminal ones, as when a pregnant woman is mal-treated, and her offspring is supposed to have died from the injury. It is, however, of the greatest importance, from its bearing on the two great medico-legal subjects of Abortion and Infanticide; and I shall notice it at this time, as an introduction to them.

During pregnancy, the life of the fœtus is inferred, from the good health of the mother; the progressive increase of the abdomen in size;

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* Foderè, vol. 2, p. 31.

† Percival's Medical Ethics, p. 84.

‡ On this question see, Foderè, vol. 2, p. 25. Capuron, p. 131. Smith, p. 365 to 377. Mahon, vol. 3, p. 381, &c.

and the motion of the fœtus being experienced. These form strong presumptive evidence, but there are exceptions to all of them. Healthy females may bring forth dead children, while sickly ones have produced living children. The increase of the abdomen also may be owing to a mole, or to dropsy; while the irregularities that are experienced respecting the motion of the fœtus, are sufficient to render it very uncertain. In many cases, the mother has imagined that she felt life to the moment of the delivery of a dead child; while, on the contrary, I need hardly add, no motion, or a very slight one, has been experienced for a considerable time previous to the most favourable labours.

The same uncertainty attends the proofs of life during delivery. The limpidity of the waters—the regularity of the pains, and their gradual increase in strength—the pulsation of the heart and umbilical cord of the fœtus; or, if it is not practicable to ascertain these last, the pulsation at the anterior fontanelle—and the swelling, tension, and elasticity of the presenting part, together form an incontestable chain of evidence in favour of its presence. Separately, however, they are susceptible of doubt. The two first are uncertain—the third may be impracticable—the occurrence of the fourth is denied by some authors; and it may be wanting in children who are apoplectic or feeble, and who notwithstanding have recovered after birth.[*] The last is a very favourable sign; but death may ensue during delivery, and the congestion induced by the detention in utero preserve it.

In investigating, on the other hand, the signs of the death of the fœtus, we must refer, in the first place, to the causes that may have induced it. As to the mother, these are numerous. The unhealthiness of her habitation—the mode of dress—the want of food, or improper use of it—violent exercise—too great labour—violent passions of the mind, either of the exciting or depressing kind—venereal excess—intemperance—diseases, such as hæmorrhage or convulsions—contagious disorders, such as syphilis or small-pox—falls, wounds, and accidents generally—any inordinate evacuation—and indeed all the causes of abortion, as enumerated by authors, may have produced the death of the infant.

The child may also be destroyed during labour, from that process being long protracted—from its being so difficult as to require instruments, or complicated with syncope, convulsions, or hæmorrhage—from a morbid state of the placenta; or a twisting of the umbilical cord round its neck.

It is hardly necessary to add, that fatal as each of these causes have respectively been, at various times, yet children have often survived in spite of them.

The signs experienced during pregnancy, of the death of the fœtus, are a want of motion in the child—the womb feels as if it contained a dead weight, which follows the direction of the body as it moves to one side or the other—the navel is less prominent—the milk recedes, and the breasts become flaccid—the mother feels a sense of lassitude and coldness, accompanied with headache and nausea. As equivocal signs, may be added, a paleness of the face—the eye-lids having a livid circle around them—the presence of a slow fever and melancholy, and a fœtid breath.

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[*] It can of course only be ascertained when there is a natural presentation, and hence is not always applicable.

These, if all present, form a strong presumption in favour of the destruction of the offspring. Individually, however, they are liable to be mistaken or confounded.

If actually dead, and long detained in the uterus, putrefaction takes place; the membranes lose their vitality, and blackish fœtid discharges shortly occur. It has been asserted, that if the membranes be not broken, the fœtus may remain a long time in utero, without decomposition. This is mentioned by Baudelocque and others; but authors, in commenting on it, have strongly insisted that these instances are extremely rare.* The uncertainty to which this last sign is liable, I shall presently state.

The signs during delivery, of the death of the fœtus, are similar in some respects to those already mentioned, such as the absence of motion, and fœtid discharges. Writers have also mentioned the state of the presenting part. When the fœtus is dead, it has an œdematous or emphysematous feel—the skin is soft, and easily torn, and the bones of the cranium lose their natural connection, and vacillate on one another. The umbilical cord also, if it can be examined, is found to be withered and rotten.

Although these are strong proofs, yet the practitioner should not hastily pronounce on them. The fœtid discharges, or odour, may be owing to the premature passage of the meconium, or to the mixture of a small quantity of blood with the uterine discharge. The former of these was at one time supposed to indicate death with certainty; but it is now ascertained, that although it portends danger, yet children have, notwithstanding, been born strong and healthy.† The state of the skin and bones may be the effect of weakness, as also the looseness of the epidermis. Even its livid colour is not infallible. Vicq. D'Azyr mentions a case that occurred at Breslaw, where the arm of the infant protruded from the uterus, and was so cold and livid, that it was deemed gangrenous, and was amputated. Notwithstanding this, the infant was born alive three days after.*

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* Belloc, p. 94. Foderé, vol. 2, p. 88. Jaeger in Schlegel, vol. 5, p. 69, opposes this opinion very strongly.

† "We may, however, in general conclude, when the meconium does come away in a natural presentation, that the state of the child is not without danger; and, for ~~many years, I never saw a child, representing with the head~~, born living, when the meconium had come away more than seven hours before its birth. But at length I met with a case, in which the meconium was discharged for more than thirty hours; at the end of which time, though the woman was delivered with the forceps, the child was born healthy and strong. And, since that time, I have had many equally convincing proofs, that the coming away of the meconium is a very doubtful sign of the death or dangerous state of the infant, whatever may be the presentation."—Denman, p. 395. See also Belloc, p. 91. Capuron, p. 247. Burns' Midwifery, Note to chap. 7.

We must recollect, also, that the pressure occasioned by a long and tedious delivery may extinguish life. The proofs now enumerated, indicative of putrefaction, will, in that case, generally be wanting. The motion of the fœtus, which has lately been felt, will suddenly cease, and tumefaction and redness of the presenting part will be observed. Ecchymosis sometimes occurs, owing to a rupture of the vessels, and an effusion of blood into the adjacent cellular tissue.

If the medical examiner be called immediately aftet birth, he can have no difficulty in deciding on this question. The body will be found to have lost its firmness and consistence—the flesh will be soft, and the muscles easily torn—the skin will exhibit marks of putrefaction, and will be of a purplish or brownish red colour—the epidermis is raised, and may be easily separated—a bloody serum is often effused in the cellular tissue, and beneath the skin, especially about the cranium; and sometimes a similar effusion is observed in the cavities of the chest and abdomen, and their viscera are of a deep reddish hue. The umbilical cord is livid, soft, and easily torn. The cranium and thorax are flattened, and the membranes uniting the bones of the head are much relaxed, so that the bones are somewhat disunited—the brain also is almost fluid, and has a fœtid odour.

It will readily occur, from a review of the remarks contained in this section, that the fact of the death of the fœtus before or during delivery, can be ascertained with considerable facility, if the practitioner be called at the proper season. Unfortunately, however, in most cases which come before a court of justice, the delivery has been secret, and a greater or less space of time has elapsed since its occurrence. The infant is found dead. The proofs which we have now enumerated, are inapplicable or inconclusive, and a further investigation is required to ascertain the truth. We hence come to the examination of the question of INFANTICIDE.†

2. *Of the signs of the maturity or immaturity of the child.*

A knowledge of these is no less necessary, than of those noticed in the preceding section. The medical examiner, in all cases, should be well acquainted with the indications that mark the various epochs of fœtal, as well as those which prove its arrival at maturity. A sketch, therefore, of the gradual developement of the fœtus, from the æra of its first formation, will be proper in this place. And I will premise that the following summary is drawn from the observations of Aristotle, Hippocrates, Riolan, Haller, Roederer, Meckel, Burton, Baudelocque, Wm. Hunter, Burns, Chaussier, Beclard, Capuron, Clarke, Merriman, and Soemmering.

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* Foderè, vol. 2, p. 91.

† The authorities on this section, which deserve attention, are, Denman, p. 391 to 399. Capuron, p. 234, &c. Hutchinson, p. 17. Foderè, vol. 2, p. 81. Smith, p. 815. Belloc, p 91. Dr. Jaeger's dissertation on this subject, (in Schlegel, vol. 5, p. 23,) may be consulted with great advantage. Several cases are related by the author, where he examined infants dead before birth, with a direct view to the question now noticed.

From the time of the first evidence of impregnation to the fifteenth day, the product of conception appears only as a gelatinous, semitransparent, flocculent mass, of a greyish colour, liquefying promptly, and presenting no distinct formation, even by the aid of the microscope. At thirty days, it has the size of a large ant, according to Aristotle, or of a barley-corn, according to Burton. Baudelocque, however, observes, that it is not larger than the malleus of the tympanum. Its length varies from three to five lines. At six or seven weeks, its length is almost ten lines. The form and lineaments of the principal organs, and the place from which the members are to arise, can now be observed, and it is equal in size to a small bee. At this time, also, the fluid contained in the membrane is much heavier than the embryo. At two months, the length is about two inches, and its weight nearly two ounces. All the parts are perfectly distinct, and many points of ossification are observed in the head, trunk, and members. Sometimes the male sex may be distinguished. At the third month, it is about three and an half inches long, and between two and three ounces in weight. The nose and mouth are formed, and the features of the face become more distinct. The eyes are shut, and the eyelids adhere together—the head is longer and heavier than the rest of the body—the umbilical cord is formed—the genitals are distinct—the penis and clitoris are relatively very large—the nymphæ are projecting, and the labia very thick. At the fourth month, the fœtus is from five to six inches long, and weighs from four to five ounces. The external parts all develope themselves, with the exception of the hair and nails. The great relative proportion of the fluid of the membranes disappears, and the fœtus nearly fills the cavity of the uterus. During the fifth month, the motions of the fœtus are felt by the mother. The length is from seven to nine inches, and the weight nine or ten ounces. The brain is pulpy, and is destitute of circumvolutions or furrows. The external ear is completed about this time, although its shape, which is like that of a gently-depressed circle, differs from the ear after birth.

In the sixth month, we begin to find some traces of fat under the integuments, where previously nothing but a mass of gelatine had been observed. The head also, which before had been proportionably large, becomes smaller in comparison of the body. It is now, however, large and soft, and the fontanelles are much expanded. The brain acquires rather more consistence, but is still easily dissolved; and the pia mater seems only to lie over its surface, being separated with great facility. The skin is very fine, pliant, thin, and of a purple colour, especially in the palms of the hands, the soles of the feet, the face, lips, ears, and breasts. In males, the scrotum is slightly developed, and of a bright red colour; and the testicles are still in the abdomen. In females, the vulva is projecting, and the labia separated by the protuberance of the clitoris. The hair on the head is very thinly dispersed, short, and of a white or silvery colour—the eyelids are closed; the hair on the eyebrows and eyelashes but thinly scattered, and the pupil is closed by a membrane. The nails are wanting, or scarcely apparent. The lungs are very small, white, and compact. The heart is large, and the liver very large, and situated near the umbilicus—the gall-bladder contains only a small quantity of a nearly colourless fluid; and the meconium is small in quantity, and is found only in a part of the large intestines. The bladder is hard and pyriform, and has a very small cavity. The ordinary weight of the fœtus, at this time, is from one to two pounds; and its length from nine to twelve inches—*the middle of which is at the abdominal extremity of the sternum.**

At the seventh month, all the parts, both external and internal, are still more developed. The skin assumes a rosy hue, and becomes more dense; and it is covered with a sebaceous fluid, so as to form a whitish, unctuous covering. The eyelids are no longer united, and the membrana pupillaris separates, so as to form the pupil. The cerebral pulp becomes more consistent, and its surface is a little furrowed, and adheres somewhat to the meninges. The meconium increases in quantity—the hair on the head is longer, and takes a deeper hue. The nails acquire more firmness. Weight from two to three pounds. Length from twelve to fourteen inches—*the middle of which is nearer to the sternum than to the navel.*

At the eighth month, the skin has acquired more density, and becomes whiter; it is covered with very fine and short hairs, and its sebaceous covering is more apparent. The nails are firmer; the hair of the head longer, and more coloured. The breasts are often projecting, and a lactiform fluid may be pressed from them. The testicles in males are frequently engaged in the abdominal ring. In females, the vagina is covered with a transparent mucus. The grooves in the cerebral substance gradually become more marked; and the spinal marrow, pons varolii, and medulla oblongata, acquire a remarkable consistence, and even firmness. The lungs are of a reddish colour—the liver preserves nearly its former relative size, but it is more remote from the navel—the fluid in the gall-bladder is of a yellowish colour, and has a bitter taste. The weight at this time is from three to four, and sometimes even five pounds. Length sixteen inches or more—*the middle of which is nearer to the navel than to the sternum.*

At the ninth month, ossification is more complete—the head is large, but it has a considerable degree of firmness. The bones of the cranium, although moveable, touch each other with their membranous margins—the fontanelles are smaller; the hair is longer, thicker, and of a deeper colour; and the nails become more solid, and prolonged to the extremity of the fingers. The circumvolutions on the surface of the brain are more numerous—the cineritious portions begin to be distinguished by their colour; and although the lobes which compose the cerebrum retain their former softness, yet the cerebellum, and the basis of the cerebrum, have acquired a remarkable consistence. The head measures longitudinally, from the forehead to the occiput, four inches to four inches and a quarter; and transversely, from three and a half to four inches. The abdomen is now large and round. The lungs are redder and more voluminous. The canalis arteriosus is large, and its coats are thicker and denser than formerly. The meconium fills nearly the whole of the intestines, and the bladder contains urine. In fact, the digestive apparatus, the heart and the lungs, are in a state fit to commence extra-uterine life. The length varies from nineteen to twenty inches or more—*the middle of which is at the navel, or a very little below.**

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* In the Quarterly Reports of the New-Town Dispensary, (Edinburgh,) there are two cases mentioned, which it will be proper to add in this place. A child, supposed to be advanced six and half months, lived eleven days. On the fifth day after its birth, it weighed two pounds nine ounces and three-quarters avoirdupois. Another, probably at the sixth month, lived fourteen hours—weighed two pounds four and a half ounces English, and measured thirteen and seven-eighths inches.—Edinburgh Med. and Surg. Journal, vol. 13, p. 249, 526.

The observations of M. Beclard on the skeleton may also be stated, as its increase is more regular than that of the softer parts, and its appearance may afford important evidence in cases which vary from the ordinary state.

"After two months have elapsed from the period of conception, the skeleton is about four inches and three lines in length, that of the spine being two inches. At three months, the former is six inches and the proportion of the spine as two and two-thirds to six. At four months and a half, it is nine inches, and the spine four. At six months, twelve inches, and the spine five. At seven and a half months, fifteen inches, the spine six and one-third. At nine months, or the period of birth, it is ordinarily from sixteen to twenty inches in length, or at a medium of eighteen inches, and the spine is in the proportion of seven and three-fourths to eighteen, to the whole length of the body. These calculations were made from observations on about fifty fœtuses, at each of the periods above indicated.

Each vertebra, consisting originally of a section of a solid cylinder, and a ring furnished with several apophyses, is in general formed by three primitive points of ossification; the one anterior, which, by its developement, forms the body or solid part of the bone; and two lateral ones, which constitute the apophysarial masses, and which, uniting together with the former, constitute the annular structure. Besides these, each vertebra is completed by several secondary points of osseous developement.

At about the sixth month of intra-uterine life, two points of ossification are found in the second cervical vertebra, one situated above the other. Towards the seventh month, the superior point, which answers to the odontoid process, is larger than the inferior, which relates to the body of the bone. At about the eighth month, the transverse processes have begun to ossify in the first of the lumbar vertebræ. At the time of birth, ossification has commenced in the body of the first cervical vertebra, and also in the first bone of the coccyx. At this age the body of the fourth lumbar vertebra, which is the most voluminous, is three lines in depth and six lines in breadth. At the same period, the lateral portions of the six superior dorsal vertebræ begin to unite together, so as to form a ring posteriorly to the bodies of those bones. The lateral arch of the second, which is the largest, forms a chord of seven or eight lines."[*]

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* Hutchinson, p. 6 to 14. Capuron, p. 165 to 178. Foderé, vol. 2, p. 149. Burns, p. 114 to 118.

The weight of the fœtus at the full term of utero-gestation, has been the subject of numerous observations, and, as a preliminary remark, it must be noticed, that this differs according to the conformation and habits of the parent and the sex of the child. Healthy females residing in the country, or engaged in active occupations, have generally the largest children. Male children, also, generally weigh more than female ones.

In Germany, Roederer found the weight, in one hundred and thirteen cases, to vary from seven to eight pounds, and he lays it down as a rule, drawn from his observations, that it is rarely less than six pounds.[†] Dr. Hunter states, that Dr. Macauley examined the bodies of several thousand new-born and perfect children at the British lying-in hospital, and found that the weight of the smallest was about four pounds, and the largest eleven pounds two ounces, but by far the greater proportion was from five to eight pounds.[‡] Dr. Joseph Clarke's enquiries furnished similar results. The greatest proportion of both sexes, according to him, weighed seven pounds, yet there were more males than females found above, and more females than males below that standard. Thus, out of sixty males and sixty females, thirty-two of the former and twenty-five of the latter weighed seven pounds, and there were fourteen females, but only six males, who weighed six pounds. On the other hand, there were sixteen males, but only eight females, who weighed eight pounds. Taking then the average weight of both sexes, it will be found that twelve males are as heavy as thirteen females. The exact average weight of male children, according to Dr. Clarke, was seven pounds five ounces and seven drachms, and that of female, six pounds eleven ounces and six drachms.[§]

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[*] Hutchinson on Infanticide, pages 12, 13, 14.

[†] Bose *de Diagnosi vitæ fœtus et neogeniti*, in Schlegel, vol. 3, p. 23. I have selected this as the most accurate account of Roederer's observation, as there is a discrepancy among the writers that notice him. Foderè (vol. 2, p. 158) says the weight, according to his table, is from six to seven and a half pounds, and Hutchinson (p. 15) from five to six and a half.

[‡] Hunter's Anatomy of the Human Gravid Uterus, p. 68.

[§] Phil. Transactions, vol. 76, p. 349. Dr. Clarke also mentions the following ~~observations as made by Roederer.~~ The placenta of a male was found to weigh, on an average, one pound two ounces and a half; whilst that of a female weighs half-an-ounce less. Female children, who at the full time weigh under five pounds, rarely live; and few males, who even weigh five pounds, thrive. They are generally feeble in their actions, and die in a short time.

Dr. Clark, of Dublin, found the weight to vary from four to eleven pounds. Dr. Merriman states, in his lectures, that he delivered one which weighed fourteen pounds (it was born dead;) and Dr. Croft delivered one alive, weighing fifteen pounds.[*]

In France the weight seems to be less than in England. Of 1544 examined by Camus, the greatest weight was nine pounds; and of this there were sixteen instances—the ordinary, from five to seven, and the average six pounds and about a quarter: there were thirty-one instances in which it was as low as three pounds. Baudelocque, however, states that he saw several instances in which the weight was about ten pounds—a few where it was twelve, and one of thirteen. Subsequent observations on twenty thousand children, at the Hospice de la Maternité in Paris, have shown a few instances where it has been one hundred and sixty-eight ounces, that is, ten pounds and a half; and this is the highest term.[†] Capuron mentions, that he has seen two instances where the children weighed twelve pounds.[‡]

We shall, as a deduction from the above observation, be probably most correct in allowing the average to vary from five to eight pounds.[§] When there are two children in utero, the weight of each individual is generally less than that of a single fœtus, but their united weight is greater. The average weight of twelve twins, examined by D. Clarke, was eleven pounds the pair, or five and a half each. When the number of children increases above two, the aggregate weight does not increase. —Dr. Hull, of Manchester, met with a delivery of five children, who did not weigh five pounds and a quarter. They measured from eight to nine inches in length, and two of them were born alive.[||] Dr. Bryan, of Fairfield, in this state, had, however, a case of four children, which all lived a day; and their aggregate weight was eleven pounds fourteen ounces. Their length varied from 14¼ inches to 17½ inches.[¶]

The length of the fœtus, at the full time, varies much less than its weight. Roederer concludes, from his examination, that the average length of a male is twenty inches and a third, while that of a female is nineteen inches and seventeen-eighteenths. Petit assigns twenty-one inches as the usual length. Hutchinson says, it is ordinarily from nineteen to twenty-two inches, and seventeen and twenty-six inches will include the two extremes, excepting some very rare cases, while Foderè and Capuron place the extremes from sixteen to twenty-three.[*] This last author attaches great importance to the difference in the proportion between the length of the superior and inferior parts of the body, and he conceives that attention to this is one of the best modes of verifying the age of the fœtus. As a general rule, there will be an equilibrium between the upper and lower parts of the body, at the ordinary term of gestation, and the navel will be at the middle of the body, or nearly so. Before that time, the middle will approach nearer to the head, in the manner that I have mentioned in the preceding pages.[†]

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[*] Hutchinson, p. 15. Dr. Moore, of New-York, has had several cases, where the weight was full twelve pounds each; and an instance occurred in 1821, in that city, where the fœtus (born dead) weighed sixteen pounds and a half.—New-York Med. and Phys. Journal, vol. 2; p. 20.

[†] Ibid.

[‡] Capuron, p. 172. Cranzius says, he has seen one fœtus weighing twenty-three pounds, and another twenty-seven!!

[§] Dr. Willoughby, Professor of Midwifery at the College of Physicians and Surgeons of the Western District, whose practice in this branch has been very extensive for a number of years, informs me, that, as far as his observation has extended, the average weight of children is upwards of seven pounds.

[||] Phil. Transactions, vol. 77, p. 344.

[¶] New-York Med. and Phys. Journal, vol. 1, p. 417.

It is evident, that the signs drawn from the structure, weight, and dimensions of the fœtus are liable to some variety; and this depends on various circumstances, such as the age and vigour of the mother, her mode of life, the diseases to which she may have been subject, and probably the climate in which she lives.

The characters which mark the maturity and perfection of the organs and functions of the child, are thus stated by Foderè and Capuron.—The ability to cry as soon as it reaches the atmospheric air, or shortly thereafter, and also to move its limbs with facility, and more or less strength. The body being of a clear red colour—the mouth, nostrils, eyelids and ears perfectly open—the bones of the cranium possessing some solidity, and the fontanelles not far apart—the hair, eyebrows, and nails perfectly developed—the free discharge of the urine or meconium in a few hours after birth—and, finally, the power of swallowing and digesting, indicated by its seizing the nipple, or a finger placed in its mouth.

The child on the contrary is considered immature,[‡] when its length and volume are much less than that of an infant at the full time; when it does not move its members, and makes only feeble motions; when it seems unable to suck, and has to be fed artificially; when its skin is of an intense red colour, and traversed by numerous bluish vessels; when the head is covered with a down, and the nails are not formed; when the bones of the head are soft, and the fontanelles widely separated; the eyelids, mouth, and nostrils closed; when the membrana pupillaris is still present; when it sleeps continually, and an artificial heat is necessary to preserve it; and when it discharges its urine and the meconium imperfectly.[§]

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[*] Bose (in Schlegel, vol. 3, p. 25,) says, he has met with two—" Viginti et quatuor pollices ulnæ Lipsicæ pene superasse, hos ultimos autem a rusticis matribus progenitos fuisse."

[†] Capuron, p. 178. Chaussier appears to have been the first that noticed these proportions, (see Ballard, p. 168;) although Capuron does not acknowledge the obligation.

[‡] By this term is understood, a birth before the full period of gestation. There is another division, more generally adopted. A delivery before the seventh month, is called an *abortion*; and at any time between the seventh and ninth month, a *premature birth*.

[§] I insert the following extract from an English newspaper, which I accidentally met with, because it favours us with some information from an eminently expe-

Should the examiner be called on to decide this question after the death of the child, it will be his duty, after noticing such external circumstances as I have already indicated, to proceed to a dissection of the body. All those appearances which mark the presence of fœtal life, and which are distinctly explained in anatomical and obstetrical works, should be carefully noticed.* The navel, liver, heart, and particularly the lungs, should be examined; and the inquiry must be, whether the changes necessary for independent life have taken place.

3. *The state necessary to enable the new-born infant to inherit.*

It frequently becomes a question of great importance in civil cases, and particularly those relating to the disposition of property, to ascertain whether the infant is born alive. In this country, the subject becomes very interesting, since our law is borrowed from that of England, which is peculiar in some of its provisions, and enables property to be held by a certain class of persons on the establishment of the above fact. For the sake of order, I shall, in the first place, briefly notice the period of gestation, after which children are considered capable of living; secondly, mention the laws of various countries, and the decisions under them, as to what constitutes the life necessary for inheritance in the infant; and shall then conclude with some observations on the question how far deformity incapacitates from inheriting.

1. The French employ a very useful word in noticing this subject—the *viability* of the infant; and I shall take the liberty of using it, although aware that great caution is necessary in the introduction of foreign terms. As a general rule, it seems now to be generally conceded, that no infant can be born *viable*, or capable of living, until one hundred and fifty days, or five months, after conception.† There are,

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rienced accoucheur. "In the evidence on Bailey's divorce-bill, in the House of Lords, March 10, 1817, the point in dispute appeared to be, whether Mr. Bailey's child was full grown at its birth? The nurse swore that it cried with a strong voice, and was fed three times in the course of the day when it was born. Dr. Gardiner, the attending physician, corroborated the testimony of the nurse as to the full growth of the child. Dr. Merriman was then called in, and examined as to the consequences of a premature birth on the offspring. He said he had known a child, born in six months and eighteen days, live to grow up, but never to become stout. A child, born under such circumstances, would be smaller than usual; the skin would be redder, and the face not so completely formed. As far as his experience went, he should conclude that it could not cry strongly, and would be oppressed by difficult respiration. The perfect conformation of the nails, strong voice, and usual size, were proofs of a full-grown child."—Globe newspaper, March 11, 1817.

* Burns' Midwifery, p. 118 to 122.

† Dr. William Hunter, however, when asked what is the earliest time for a child's being born alive, answered, "A child may be born alive at three months; but we see none born with powers of coming to manhood, or of being reared, before seven calendar months, or near that time. At six months it cannot be." Hargrave's Note 190* on sect. 188 of Coke upon Littleton.—The Roman law, by one of its provisions, *de suis et legitimis hæredibus*, decided that a child might be born alive six months and two days after conception; and by another, *de statu hominum*, required seven months. Foderé, vol. 2, p. 110.

however, cases mentioned to the contrary. A person named Fortunio Liceti, is said to have been born after a gestation of four months and a half, and to have lived to the age of eighty.[*] Dr. Rodman, of Paisley, relates the case of an infant surviving, where the mother was confident that the period of her gestation was less than nineteen weeks. She had previously been the mother of five children. In such cases, however, we should recollect that females are liable to mistakes in their calculations; and that conception may take place at various times during the menstrual intervals, and thus vary the length of the gestation. Such early living births are, at the present day, very generally and very properly doubted.[†]

Between five and seven months, there have been instances of infants living, though most rare; and even at seven, the chance of surviving six hours after birth, is much against the child.[‡]

An opinion, which appears to be as old as the days of Hippocrates, has occupied the attention of many writers, concerning the viability of eight months' children. It seems to have been the prevalent idea, that they are not so capable of living as those of seven months. It is difficult to say on what this is founded, and it is unnecessary, in this work, to enter on its discussion. I will content myself with observing, that according to my view, the chance of a child's surviving is increased, the nearer it approaches the natural term of gestation, and that, accordingly, the viability of an eight month's child is greater than a seven month's.[§]

2. If we proceed as far back as the Roman law, we shall find provisions on the subject before us. To enable the infant to succeed to property, it was necessary that *it should be perfectly alive, "si vivus perfectè natus est;"*[‖] and the decision of Zacchias is in accordance with it. *Non nasci, et natum mori, paria sunt.*

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[*] Capuron, p. 157.

[†] In the case, by Dr. Rodman, the child was alive and healthy nine months after birth. At three weeks, he measured thirteen inches in length, and weighed one pound thirteen ounces. He was so destitute of vital energy, that life was for some time preserved by keeping him constantly in bed with the mother, or other females. The length and weight just mentioned, are those, according to the statement made in former pages, of an infant *advanced between the sixth and seventh month;* and although Dr. Rodman seems to question the accuracy of authors on this subject, yet the observations have been made in too many cases, to be affected by this solitary exception. His object in publishing this case, is certainly highly laudable; and no physician, however premature the birth may appear to him, should neglect doing every thing to support and invigorate the appearances of life that are present.—Edinburgh Med. and Surg. Journal, vol. 11, p. 455; vol. 12, p. 196. 251.

[‡] Belloc and Capuron, among modern authors, mention instances of children surviving at six and six and a half months. They were very feeble and small—the head covered only with a light down, and the nails scarcely formed. Belloc, p. 78. Capuron, p. 158.—Cases of the same nature are also scattered through the earlier authors; and most medical observers have *occasionally* met with instances of infants living at seven months. To these, it is not necessary to refer.

[§] Capuron, p. 159. Foderè, vol. 2, p. 168. Mahon, vol. 1, p. 157. Goelick in Schlegel, vol. 5, p. 139. Some writers, however, adduce the broad argument of experience, and assert that more seven month's children are reared, than those of eight months. See the review of Barlow in New England Journal, vol. 12, p. 52.

[‖] *Codex de posthumis,* quoted by Foderè.

As to France, a capitulary of Dagobert, ordained, that in order to succeed to property, the infant should live an hour, and be able to see the four walls and ceiling of the chamber. An ordinance of Louis the Ninth altered this law, and directed that it should cry, in order to enable it to succeed.[*]

The present French law is contained in the 725th and 906th articles of the civil code. *In order to succeed, the infant must be born alive; and in order to receive by testament, it is sufficient to have been conceived at the time of the death of the testator; but neither donation or testament can have effect, unless the child be born alive.*[†] And the interpretation of the word *life*, or *being born alive*, is, according to the most distinguished lawyers and physicians of that nation, *complete and perfect respiration.*[‡]

The English law, so far as it has a bearing on the question before us, is contained in the provisions concerning a *tenant by the curtesy of England*, as it is called. By this is understood, "where a man marries a woman seised of an estate of inheritance, and has by her issue, born alive, which was capable of inheriting her estate. In this case, he shall, on the death of his wife, hold the lands for his life, as tenant by the curtesy of England."[§] The exposition of commentators is as follows:—"It must be born alive. Some have had a notion that it must be heard to cry, but that is a mistake. Crying, indeed, is the *strongest* evidence of its being born alive; but it is not the *only* evidence."[‖] Coke, says, "If it be born alive, it is sufficient, though it be not heard to cry, for peradventure it may be born dumb. It must be proved that the issue was alive; for *mortuus exitus, non est exitus;* so as the crying is but a proof that the child was born alive, and so is motion, stirring, and the like."[¶] The cases to which both these authors refer, certainly prove the doctrines stated by them to be the law of England;"[**] but it is to be feared, that the broad principle thus laid down, may lead to practical injustice. I cannot better illustrate my ideas on this point, than by stating the following case, which lately occurred in England:—

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[*] Capuron, p. 198. [†] Ibid. p. 9.

[‡] "Enfin les jurisconsultes ont adopté l'opinion des medicins à cet egard, et ne font consister la vie ordinaire que dans la respiration complete. Le célèbre Merlin dit aussi, tres formellement, qu'il n'y a que la respiration complete que constitue la vie."—Capuron, p. 199.

[§] An ancient provision in the laws of Ethelbert, reverses the law as now in force. "If a *wife* brought forth children alive, and survived her husband, *she was to have half his property.*"—Edinburgh Encyclopædia, vol. 2, p. 102, Art. ANGLO-SAXON LAWS.

[‖] Blackstone, vol. 2, p. 127. [¶] Coke Littleton, 30 a.

[**] Dyer's Reports, p. 25. "It was moved, that a man shall be tenant by the curtesy, although the issue be not heard to cry, so as it can be known that it hath life; for it may be, the issue is born dumb." So was the opinion of *Fitsherbert.* This was in the 28th of Henry VIII. The other case (Paine's in 8th Coke's Reports) is instructive, because it gives us the opinion of the older writers on this subject. Glanvill says, that the husband inherits, "*ex uxore sua hæred' habuerit filium vel filiam clamantem et auditum infra quatuor parietes.*" And Bracton, "Sive superst'

In 1806, a cause entitled Fish or Fisher *v.* Palmer, was tried before the Court of Exchequer, at Westminster-hall. It appears, that an infant was born to Mr. Fish, in 1796, which was supposed to be still-born; and, on the death of his wife, he accordingly resigned her property to the legal heir. Some circumstances afterwards occurred, which induced him to bring the present action, and to attempt to prove that the child had not been born dead. Dr. Lyon (deceased at the time of the trial) had declared, an hour before the birth, that the child was alive; and having directed a warm bath to be prepared, gave the child, when born, to the nurse, to be immersed in the warm water. It did not cry, nor move, nor shew any symptoms of life; but while in the water, (according to the testimony of two females, the nurse and the cook,) there twice appeared a twitching and tremulous motion of the lips. Upon informing Dr. Lyon of this, he directed them to blow into its throat; but it never exhibited any other signs of life.

Several physicians were examined as to the deductions to be drawn from these symptoms. Drs. Babington and Haighton agreed that the muscular motion of the lips could not have happened, if the vital principle had been quite extinct; and that, therefore, the child was alive. Dr. Denman, on the contrary, gave it as his opinion, that the child was not alive. He considered that the motion of the lips did not prove the presence of the vital principle, and drew a distinction between uterine and extra-uterine life. The remains of the former, he thought, might have produced the twitching of the lips. The jury, however, found that the child was born alive; and the property which he had surrendered ten years previous, returned again to Mr. Fish.*

It will readily be observed, that a very extensive latitude is given to juries by this decision; and that they may decide contrary to what is correct in physiology, on the opinions of men incompetent to guide on this subject. In the instance before us, indeed, they were justified in their verdict by the testimony of eminent physicians, but it must also be remarked, that the proofs of life relied on by them are equivocal. It has been suggested, and I think with truth, that these convulsive motions merely show that the muscular fibre has not yet lost its contractility. Still-born infants, or those who die instantly on being delivered, are not unfrequently observed to open their mouths, and extend their arms or legs. May not these be merely the relaxation of a contracted muscle, or the stimulus of the atmospheric air on a body unaccustomed to it? Foderè remarks, that in his youth he has frequently seen still-born children carried to a chapel of the Virgin, which was

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fuerit liberi sive mortui, dum tamen semel aut vocem aut clamorem dismiserint, quod audiatur inter quatuor parietes, si hoc probet: et licet partus moriat' in ipso partu, vel vivus nascat, vel forte semi-mortuus, licet vocem non emiserit, solent obstetrices in fraud' veri hæred' protestari partum vivum nasci et legitim', et *ideo necesse est vocem probare*, et licet naturaliter mutus nascitur et surdus, *tamen clamorem emittere debet.*" The court, however, (Common Pleas, 29th of Elizabeth,) decided according to the dictum of Littleton, as adopted by the commentators in the text, that "*the crying is but a proof of the life. But in the case at bar, to remove all scruples, it was found that the issue was heard to cry.*"

* Foderè, vol. 2, p. 160. Smith, p. 388.

built on high ground. The cold air of the place produced such an excitement, that they appeared to raise their eyelids for an instant, and that instant was improved to administer the right of baptism.[*] Chaussier also examined the bodies of several children, born at five, six, and even seven months, who were said to have lived one or two hours, and in whom a motion of the jaws and members had been observed, and indeed a slight respiration. He ascertained, by dissection, that not one of them had lived after birth, and concluded, that the proofs observed owed some of their strength to the wishes of friends, and were in fact nothing more than the feeble remains of fœtal life—resembling, in many respects, the appearances observed on the body of an animal recently decapitated.[†]

The Scotch law seems to be more precise in its provisions. Individuals there, as in England, are allowed to hold property, as tenants by the curtesy. But it can only take place where the issue has been heard to cry. "Lord Stair, in his Institutes, lays it down, that the children of the marriage must attain that maturity, as to be heard to cry or weep, and adds, that the law hath well fixed the maturity of the children by their crying or weeping, and hath not left it to the conjecture of witnesses whether the child was ripe or not." A case, in conformity to this doctrine, was decided as late as 1765, in the court of session, (*Dobie* v. *Richardson.*) "Dobie's wife brought forth a child about nine months after marriage, which breathed, raised one eyelid, and expired in the usual convulsions about half-an-hour after its birth, *but was not heard to cry.* The mother died in child-bed, and the question was, whether the *jus mariti* was not lost by the death of the wife within the year, without a child of the marriage, *who had been heard to cry?* After much argument on both sides, the decree was, that as the wife did not live a year and a day after her marriage, and *as it was not proved* that the child or fœtus of which she was delivered *was heard to cry,* the husband was not intitled to any part of his deceased wife's effects."[‡]

The state of infants delivered by the CÆSAREAN OPERATION, belongs also to this place, and I shall illustrate the laws of different countries respecting them, by mentioning various cases that have occurred.

A female, the wife of Matthew Braccius, died at the seventh month of pregnancy, of a violent illness, and a quarter of an hour thereafter, an infant was taken from her by the Cæsarean operation. The father claimed to be its heir, and it was asserted, in proof of its life, that it had opened its eyes, and made some slight motions. Zacchias was consulted on this case, and, in his opinion he asserts, that these motions were mechanical, and the effect of the air on the body, and this was corroborated by the fact, that after its extraction the child was carried into a cold cellar. The decision was conformable to this opinion.[*] It appears, however, that the court of *Sancta Rosâ*, at Rome, allowed an infant to inherit, who was delivered by the Cæsarean operation, and who lived for several weeks thereafter.[†]

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[*] Foderé, vol. 2, p. 160.

Notwithstanding all this, I think that where there is a power of being affected by stimuli (other than galvanic or electric); this, in common sense, must be held to constitute vitality, and no practical good can result from nice metaphysical distinctions between fœtal and extra-uterine life, when the child is fairly in the open air.—EDITOR.

[†] Capuron, p. 198.

[‡] See a note to Dyer's Reports, 25, by the editor, John Vaillant, A.M. &c.

In France, a similar case has been made the subject of controversy. A female, residing in the department of the Loire, died in child-bed on the 2d of July, 1780, and after her death, an infant was extracted by the Cæsarean operation, which was baptised, as being alive. A law-suit was instituted on the case, and it was proved, that the infant had opened and shut its mouth for the space of half-an-hour—that one of its hands had been opened, and that it closed it again without assistance—that it vomited some froth—that it made several expirations, like a person who is dying—and that it was perfectly well-formed. It was objected, that the infant was too immature, and consequently was not viable, and of course could not succeed to property. The testimony of the witnesses was also impeached. The court, however, decided that the infant had lived, and refused to consider the question of its viability.[‡]

In England, a person cannot hold property, as tenant by the curtesy, if the child has been delivered by the Cæsarean operation. "The issue must be born during the life of the mother; for if the mother dies in labour, and the Cæsarean operation is performed, the husband, in this case, shall not be tenant by the curtesy: Because at the instant of the mother's death, he was clearly not entitled, as having no issue born, but the land descended to the child, while he was yet in his mother's womb; and the estate, being once so vested, shall not afterwards be taken from him."[§] "One Reppes, of Northumberland, took to wife an inheritrix, who was great with child by him, and died in her travail, and the issue was ripped out of her belly alive; and by reference out of the chancery to the justice, they resolved, that he should not be tenant by the curtesy, for it ought to begin by the birth of the issue, and be consummated by the death of the wife."[||]

3. The consideration of the subject, *how far deformity incapacitates from inheriting*, cannot be better introduced, than by stating the division of monsters proposed by Buffon. He separates them into three classes, monsters by excess, monsters by defect, and monsters by alteration or wrong position of parts.

Of the first class, a very remarkable instance is related in the case of twins, born at Tzoni, in Hungary, on the 16th of October, 1701. These two females were called Helen and Judith, and were separated from each other, except at the anus, where they were united, and the function pertaining to that part was performed in common. They lived to the age of twenty-two years. Judith first fell sick, but the health of Helen also became soon impaired, and the latter died three minutes after the former. They expired on the 23d of February, 1723, at Presburg.[*] The case related by Sir Everard Home, in the Philosophical Transactions, belongs also to this division. A male-child was born in Bengal, in 1793, with a well-formed body, but it had a second head, placed in an inverted position on the top of the proper one. It was equally perfect, and at the age of six months both were naturally covered with black hair. The child lived four years, and its death was owing to the bite of a *cobra de capello.* On dissection, no bone was found separating the two brains. The skulls are preserved in the Hunterian museum.[†]

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[*] Zacchias Consilium, No. 67.

[†] Foderè, vol. 2, p. 163.

[‡] Foderè, vol. 2, p. 164.

[§] Blackstone, vol. 2, p 128. See also Coke Littleton, 29 b.

[||] Paine's Case, 8th Coke's Reports.

It is barely necessary to remark, that frequent instances also occur of an increased number of organs, members, &c.

Of monsters by defect, the most remarkable are those which are born without a head, and are hence stiled *acephalous.* These live in the womb, but do not survive after birth, since the function of respiration cannot be performed. To this class also belong those which are destitute of lungs, of one or more organs of sense, &c.[‡]

The defects of the third class are seldom discovered until after death, as they are commonly internal. They are hence seldom the subject of enquiry in legal medicine. But the most remarkable instances of this nature, are those in which the rudiments, or parts of a fœtus, have been discovered.[§]

After this exposition of the condition in which monsters are generally born, we shall be enabled to apply the laws of various countries, relating to them.

As monsters by excess are *viable*, or capable of living, so, by the law of France, as already quoted, they are capable of inheriting.—Those by defect, and particularly the acephalous, are to be considered as still born—incapable of living,* and this opinion must be enforced in proportion to the importance of the organs that are wanting.—Concerning the last class, there can seldom be any controversy, as the malconformation is ordinarily not discovered until after death.

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[*] See an account of this extraordinary case in the Phil. Transactions, by J. J. Torkos, M.D. F.R.S. (vol. 50, p. 311.) A similar instance is mentioned in Piscottie's History of Scotland, p. 160. Cases of double births, united at various parts, may also be found in the Phil. Transactions, vol. 5, p. 2096; vol. 23, p. 1416; vol. 25, p. 2345; vol. 32, p. 346; vol. 45, p. 526; vol. 72, p. 44; vol. 79, p. 157. A very interesting account of a person living in China, with a male-child adhering to his breast, is contained in Chapman's Journal, vol. 2, p. 148; and vol. 3, p. 78. The individual was sixteen years old when the account was written. He is able to do the work of a husbandman. Some additional particulars concerning him will be found in Edinburgh Phil. Journal, vol. 7, p. 216. The essay of Mr. Lawrence on monstrous productions, contained in the Medico-Chirurg. Transactions, (vol. 5, p. 165,) contains numerous references to extraordinary cases.

[†] Phil. Transactions, vol. 80, p. 296; and vol. 89, p. 28.

[‡] A very curious case of deficiency of fingers (apparently hereditary) in a whole family, is related in Edinburgh Med. and Surg. Journal, vol. 4, p. 252.

[§] The following are instances of this nature. A female named *Amidee Bissieu,* in France, at whose death, at the age of fourteen, a fœtus was found in the abdomen. Edinburgh Med. and Surg. Journal, vol. 1, p. 376.—A child aged nine months, examined by G. W. Young, Esq. Medico-Chirurg. Transactions, vol. 1, p. 194.—A girl aged two years and a half, examined by Dr. Phillips of Andover. Ibid. vol. 6, p. 124.—In the London Med. Repository, (vol. 4, p. 404,) there is a reference to three other cases; and an account is also given of a fœtus found by Mr. Highmore, in the abdomen of a young man who died in 1814, aged sixteen years, at Sherborne, in Dorsetshire. A case is also mentioned as occurring in Austria, in 1812. It is related by Prochaska. London Med. Repository, vol. 6, p. 330.

The English law is thus stated by Blackstone:—"A monster which hath not the shape of mankind, but in any part evidently bears the resemblance of the brute creation, hath no inheritable blood, and cannot be heir to any land, albeit it be brought forth in marriage; but although it hath deformity in any part of its body, yet if it hath human shape, it may be an heir." This, he adds, is a very ancient rule in the law of England; and observes, that "the Roman law agrees with our own in excluding such births from succession, yet accounts them, however, children in some respects, where the parents, or at least the father, could reap any advantage thereby, esteeming them the misfortune, rather than the fault, of that parent. But our law will not admit a birth of this kind to be such an issue as shall entitle the husband to be tenant by the curtesy, because it is not capable of inheriting.†

As there are instances in which the issue should be male, in order to inherit, it will be proper to repeat a caution already given—not to mistake the enlarged state of the clitoris, which is very common at birth, for male organs. Foderè mentions instances where females have, in consequence of this, been inscribed in the baptismal registers as males; and, in one case, the individual was called out under the conscription law.‡

As EXTRA-UTERINE FŒTUSES have never been brought forth alive, there can, of course, no question arise concerning them.§

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* There are, however, instances in which acephalous monsters have lived for a short time. Mr. Lawrence mentions one, which, although deficient in brain and cranium, was perfectly formed in all its other parts, and lived four days. Some valuable physiological remarks on these productions may be found in the Edinburgh Med. and Surg. Journal, vol. 11, p. 351.

† Blackstone, vol. 2, p. 246.

‡ Foderè, vol. 2, p. 179.

§ When I wrote this, I had not seen the cases mentioned in the New-England Journal, vol. 8, p. 118 and 403; one by Dr. Delisle of Paris, and the other by Mr. King of South-Carolina. In both instances, extra-uterine fœtuses *are said* to have been extracted, by cutting through the vagina. The first lived three-quarters of an hour, and the second seems to have survived at the time when the narrative was written. Should a legal question ever occur concerning such, I presume the same provisions which are in force respecting those extracted by the Cæsarean operation would guide here.

CHAPTER VIII.

INFANTICIDE.*

1. History of infanticide among different nations, ancient and modern.—2. Definition of infanticide—of the murder of the fœtus in utero, or criminal abortion—period at which the fœtus is to be considered as possessing life—proofs of abortion derived from an examination of the living and dead mother—causes of abortion, criminal and involuntary—examination of the fœtus.—3. Of the murder of the child after it is born—proofs of infanticide derived from an examination of the child—proofs of the blood having circulated after birth—*(a)* appearance of the blood—*(b)* ecchymosis—proofs of respiration having taken place after birth—*(a)* of the floating of the lungs in water—examination of the objections to this test—*(b)* Ploucquet's test—examination of objections to this test—*(c)* Daniel's test—*(d)* descent of the diaphragm—*(e)* diminution of the size of the liver—*(f)* discharge of the meconium—*(g)* state of the urinary bladder—Capability of the child's living after birth—The various means used for perpetrating infanticide—infanticide by omission—infanticide by commission — 4. Of the method of conducting anatomical examinations in cases of infanticide. —5. Prevention of infanticide—history of legislation on the subject of infanticide —foundling hospitals.

In discussing the subject of Infanticide, the following order will be observed:

1. The history of Infanticide, as it has prevailed in different nations, ancient and modern.
2. The murder of the fœtus in utero, or criminal abortion, embracing an account of its proofs and causes.

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* I am indebted for this chapter to my brother, John B. Beck, M. D. of New-York. It is well known that Infanticide formed the subject of his Inaugural Dissertation in 1817; and I trust fraternal partiality will be pardoned, when I cite the following testimonies in commendation of it. "I have been favoured," says Dr. Smith of London, in the preface to his work on legal medicine, "with the perusal of an inaugural dissertation on infanticide, by Dr. Beck of New-York, which has afforded me great satisfaction. It is but justice," he adds, "to mention, that the American schools have outstripped us in attention to forensic medicine." The Editors of the American Medical Recorder (vol. 2, p. 432,) remark, that "this dissertation is unquestionably the most complete in all its parts, that we have ever seen on this subject." Judge Cooper, also, in several parts of his Tracts on Medical Jurisprudence, speaks of it with high approbation. At my request, my brother consented to revise the subject-matter of his dissertation, and prepare it for publication in the present work. This he has accordingly done; and the chapter will be found to contain much valuable and original matter, not embraced in his previous essay. T. R. B.

3. The murder of the child after it is born, with an account of its various proofs and causes.

4. The method of conducting anatomical examinations in cases of infanticide.

5. The prevention of infanticide, including a history of legislation on the subject, and an examination of the effects of foundling hospitals.

1. *Of the history of infanticide, as it has prevailed in different nations, ancient and modern.*

It is a fact no less melancholy than astonishing, that a practice so unnatural as that of infanticide, should ever have prevailed to any extent. Its existence might have been supposed possible in those unhappy regions of our earth, where untutored passion and brutal sense reign triumphant over reason and morality; but that the fairest portions of society, where genius, science, and refinement had taken up their abode, should have been disgraced by a crime so disgusting, is one of those anomalies in the history of human feeling and conduct, which irresistibly prove how perfectly arbitrary and undefined are the laws of justice and humanity, when unguided by the principles of true religion. The fact, however, is not more astonishing than true. A slight review of its history will show us that this practice prevailed in almost all the ancient nations, and that it is not even yet blotted from the list of human crimes.

The *laws of Moses* are silent on the subject of infanticide;* and from this circumstance we should be led to conclude, that the crime was unknown among the Jews at that period of their history, and therefore that any positive prohibition of it was considered unnecessary. The penal code of the Jews is so very minute on the subject of murder in general—considers it so atrocious a crime, and denounces such terrible punishments against the perpetrators of it, that it is wholly incredible that the murder of infants would have been countenanced by their illustrious legislator. This conclusion is further confirmed by the considerations, that barrenness was esteemed one of the greatest misfortunes which could befal a Jewish woman, and that the Jews were all desirous of a progeny, because each cherished the hope that the Messiah might be numbered among his descendants. These facts prove that every inducement was held out for the propagation of children, and none to countenance their destruction. At a subsequent period, when they become contaminated by their intercourse with the Canaanites, we find the Jews imitating † the example of their king Manasseh, who sacrificed his son to the idol Molech.‡ These horrid sacrifices were suppressed by king Josiah, who commanded, "that no man might make his son or his daughter to pass through the fire to Molech."§ And Tacitus, in describing the manners of the

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* Michaelis' Commentaries on the Laws of Moses, vol. 4.

† Jeremiah, vii. 31; and xix. 5. ‡ 2 Chron. xxxiii. 6. 2 Kings, xxi. 6.

§ 2 Kings, xxiii. 10.

Jews of his day, says that they were not allowed to put their children to death.[*]

The nations surrounding the Jews appear to have been addicted to the sacrifice of their children. Of these, the *Canaanites* are described as " sacrificing their sons and their daughters unto devils, and shedding innocent blood, even the blood of their sons and their daughters, whom they sacrificed unto the idols of Canaan."[†]

Among the *Egyptians*, infants were treated with more humanity; yet instances are not wanting of the greatest cruelty towards them.—A memorable one is found in the commission of Pharaoh to the midwives, to murder all the male-offspring of the Jews. Their own children, however, were treated with greater tenderness; and they are accordingly, on this account, mentioned with honour by some of the writers of other countries. Strabo, in particular, speaks of them as an honourable exception to those nations who exercised the right of life and death over their infants.[‡]

Among the *ancient Persians*, it was a common custom to bury children alive. Herodotus tells us of Amestris, the wife of Xerxes, who, at an advanced age, ordered fourteen Persian infants, of illustrious birth, to be interred alive, in honour of one of the deities of the country.[§]

In most of the *Grecian states*, infanticide was not merely permitted, but actually enforced by law. The Spartan lawgiver expressly ordained, that every child that was born should be examined by the ancient men of the tribe; and that, if found weak or deformed, it should be thrown into a deep cavern at the foot of Mount Taygetus, called *Apothetæ*, " concluding that its life could be of no advantage either to itself or to the public, since nature had not given it at first any strength or goodness of constitution."[||] This practice was not, however, upheld merely by the sanction of law; it was defended by the ablest men of Greece. Aristotle, in his work on government, enjoins the exposure of children that are naturally feeble and deformed, in order to prevent an excess of population. He adds, " if this idea be repugnant to the character of the nation, fix at least the number of children in each family; and if the parents transgress the law, let it be ordained, that the mother shall destroy the fruit of her body before it shall have received the principles of life and sensation."[¶] The mild Plato also justifies this practice. In his Republic he directs that " children born with any deformity, shall be removed, and concealed in some obscure retreat."[**]

Of the existence of infanticide at *Athens*, we have the testimony of the comic poets, who, in describing the manners of that city, frequently allude to the exposure of children.[††]

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[*] Hist. Lib. v. chap. 5.

[†] Psalm cvi. 37, 38.

[‡] Beckman on Invent. vol. 4, p. 435.

[§] Beloe's Herodotus, vol. 4, p. 87.

[||] Plutarch's Lives, translated by Langhorne, vol. 1, p. 142.

[¶] Travels of Anacharsis, vol. 5, p. 270.

[**] Ibid. vol. 4, p. 342.

[††] Vide Quarterly Review, vol. 2, p. 389, for quotations from Terence and Plautus.

Thebes, however, exhibited a noble contrast to the rest of Greece. By one of her laws, it was expressly forbidden to imitate the other Grecian cities, who exposed their children at their birth.[*]

But of all the nations of antiquity, the *Romans* were the most unrelenting in their treatment of infants. The Roman father was vested with an absolute authority over the lives and fortunes of his children,[†] and we have abundance of testimony to show that the right was commonly exercised. This barbarous prerogative was coeval with the existence of Rome, and continued to triumph over justice and humanity during the lapse of many ages, until Christianity wrested it from her. Romulus authorised the destruction of all children that were deformed. He, however, required the parents to exhibit them to their five nearest neighbours, and to obtain their consent to their death.[‡] The law of the Twelve Tables, enacted in the 301st year of Rome, sanctioned the same barbarous practice.[§] After this, even the slight restrictions which Romulus had imposed upon parents, appear to have been removed, and an unqualified jurisdiction surrendered to the father over the lives of his children, even after they had arrived to years of maturity. Sallust mentions an instance of the latter. "Fuere tamen extra conjurationem complures, qui ad Catalinam initio profecti sunt: in his A. Fulvius, senatoris filius; quem retractum ex itinere, *parens jussit necari*."—Sallust, Cat. xxxix.

The procuring of *abortion*, which can be considered no less than murder, was also notoriously prevalent among the Romans. Juvenal thus speaks of that nefarious practice:

Hæ tamen et partus subeunt discrimen et omnes
Nutricis tolerant, fortuna urgente, labores
Sed jacet aurato vix ulla puerpera lecto;
Tantum artes hujus, tantum medicamina possunt,
Quæ steriles facit, atque homines in ventre necandos
Conducit. [||]——Juv. Sat. vi. 592.

Minucius Felix thus describes the barbarity of the Romans in this respect: "I see you exposing your infants to wild beasts and birds, or strangling them after the most miserable manner. Nay, some of you will not give them the liberty to be born, but by cruel potions procure abortion, and smother the hopeful beginning of what would come to be a man, in his mother's womb."[*] Pliny the Elder himself defends the right of parents to destroy their children, upon the ground of its being necessary to preserve the increase of population within proper bounds.

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[*] Travels of Anacharsis, vol. 3, p. 277.

[†] The right of parents over their children is thus stated in the Justinian Institutes, lib. 1. tit. ix. p. 22. Cooper's edit. Jus autem potestatis, quod in liberos habemus, proprium est civium Romanorum; nulli enim alii sunt homines, qui talem in liberos habeant potestatem, qualem nos habemus.

[‡] Montesquieu's Spirit of Laws, vol. 1, p. 104. Lond.

[§] Cooper's Justinian, p. 659.

[||] "Yet these, though poor, the pain of childbed bear,
And without nurses their own infants rear.
You seldom hear of the rich mantle spread
For the babe, born in the great lady's bed.
Such is the power of herbs; such arts they use
To make them barren, or their fruit to lose."

Dryden's Juvenal.

Such was the practice of ancient Rome from her first origin down to the time of Constantine the Great. During the days of her greatest political grandeur it was carried to the highest excess; and whilst she was boasting of her refinement, and casting the opprobrious epithet of barbarian on all around her, she was guilty of the basest profligacy, and the most hardened cruelty. Christianity first opposed a barrier to the desolations of this crime; her mild and humane spirit could not but discountenance it; and accordingly it animated all who were arrayed under her peaceful banners, to exert their energies in arresting its progress. The christian writers of that day are full on this point. Tertullian, in his Apology, expresses himself with heroic boldness on the subject: "How many of you," (addressing himself to the Roman people, and to the governors of cities and provinces,) "might I deservedly charge with infant murder; and not only so, but among the different kinds of death, for choosing some of the cruelest for their own children, such as drowning or starving with cold or hunger, or exposing to the mercy of dogs; dying by the sword being too sweet a death for children, and such as a man would choose to fall by sooner than any other ways of violence. But christians now are so far from homicide, that with them it is utterly unlawful to make away a child in the womb, when nature is in deliberation about the man; for to kill a child before it is born, is to commit murder by way of advance; and there is no difference, whether you destroy a child in its formation, or after it is formed and delivered; for we christians look upon him as a man who is one in embryo; for he is a being like the fruit in blossom, and in a little time would have been a perfect man, had nature met with no disturbance."[†] In A. D. 315, Constantine the Great enacted a law providing for the maintenance and education of those children whose parents were too poor to do the same.[‡] He also ordered a severe punishment to be inflicted on a cruel father. This was the first time that the authority of the government had interposed to arrest this crime; and it is not to be supposed, that a custom which had become so familiar to all the habits and feelings of the Roman people would be immediately suppressed: and accordingly we find that it still continued to prevail, though in a less degree, until the end of the 4th century, when it was finally exterminated by the emperors Valentinian, Valens, and Gratian.

The *Phenicians* and *Carthagenians* were in the habit of sacrificing infants to their gods. The latter had a law by which four children of noble birth were regularly immolated upon the altars of Saturn.[§] History records a melancholy instance of the superstition and cruelty of these deluded people. It is related, that they attributed their defeat by Agathocles, king of Sicily, to an omission of these sacrifices, and in order to atone for their past neglect, they offered up, at one time, two hundred of the sons of their nobility.

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[*] Octav. Minucii Felicis, ch. xxx.

[†] Reeves' Apologies, &c. vol. 2, p. 190.

[‡] Ant. Univ. Hist. vol. 15, p. 576.

[§] Ant. Univ. Hist. vol. 17, p. 257.

Silius Italicus notices this custom:

> "Mos fuit in populis, quos condidit Advena Dido.
> Poscere cæde deos veniam, ac flagrantibus aris
> (Infandum dictu) parvos imponere natos." Lib. 4.

The *ancient Germans*, although in the habit of sacrificing prisoners taken in battle, do not appear to have been addicted to the crime of infanticide. Tacitus, in describing their manners, mentions a contrary practice as one of the peculiarities distinguishing their character; "Numerum liberorum finire, aut quenquam ex agnatis necare, flagitium habetur."[*]

Among the *Visigoths*, the murder of infants was a common crime. Chindaswinthus, one of their kings, in his laws, describes the procuring of abortion, as well as the murder of children after they are born, as practices that were prevalent in the provinces, and denounced severe penalties on the perpetrators of those crimes.[†]

But *infanticide* was not confined to the ancients. It has descended to modern nations, and at the present day disgraces Eastern and Southern Asia by its enormities.

The *Chinese* are notorious for their cold indifference in the exposure and murder of their children. According to Mr. Barrow, the number of children exposed in Pekin alone, amounts to 9000 annually. No law exists to prevent it.[‡] On the contrary, it appears rather to be encouraged, inasmuch as persons are employed by the police of the city to go through the different streets every morning in carts, to pick up all the children that may have been thrown out during the night. "No inquiries are made; but the bodies are carried to a common pit without the walls of the city, into which all, whether dead or living, are promiscuously thrown."[§] The practice is not confined to the capital; it prevails also in other parts of the country. It is calculated that the number of infants destroyed in Pekin, are about equal to that of all the rest of the empire.[||] Almost all those that are exposed are females. The causes assigned for its prevalence, are extreme poverty, arising from an overgrowth of population—frequent and dreadful famines springing from the same cause—the natural coldness of affection in the Chinese,—together with the sanction of custom, and the want of any law forbidding it.[¶]

Among the *Hindoos*, infanticide presents itself in a form still more horrible. It is incorporated into their system of religion, and its atrocities are beyond description. The blood of their infants seems to have quenched completely the sacred flame of humanity, while the lights of reason and truth are extinguished by the absurdities of superstition. This crime has existed among them for at least 2000 years, for Greek and Roman historians notice it, and refer to some of the very places where it is now known to exist.* The number of infantile murders in the provinces of Cutch and Guzerat alone, amounted, according to the lowest calculation in 1807, to 3000 annually;† according to another computation, 30,000. Females are almost the only victims. In defence of the practice, they urge the difficulty of rearing female children, the expense attending their education, and the small probability of their ever being married.‡ Within a few years, through the benevolent exertions of some of the subjects of Great Britain, infanticide has been completely abolished in many of the provinces. Mr. Duncan, governor of Bombay, Marquis Wellesley, and Col. Walker, were the persons who took the lead in this affair, and by whose energy and perseverance, results, so honourable to themselves, and which may be expected to have a beneficent influence on the progress of civilization, were accomplished.§

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[*] De Morib. Germ. xix. [†] Ryan on the Effects of Religion on Mankind, p. 110.

[‡] Annual prohibitions are issued by the Governor, expressing great indignation at the cruelty and wickedness of the practice. From these being so often repeated, we may infer that they are but little attended to.—EDITOR.

[§] Barrow's Travels in China, p. 113. Am. ed.

[||] Ibid. p. 114. Also De Pauw's Philosophical Dissertation on the Egyptians and Chinese. Quarterly Review, vol. 2, p. 255.

[¶] Mr. Ellis, in his Journal of the British Embassy to China, in 1816, expresses some doubts with regard to the frequency of infanticide in China, and at the same time is of opinion that the population has been greatly overrated. Vol. 2, p. 209.

Previously to the late conversion of *Otaheite* to Christianity, infanticide was so common, that it threatened the complete depopulation of the island. According to a late voyager,‖ at least two-thirds of the children born were destroyed. The effect which it had in diminishing the number of inhabitants was astonishing; and affords a strong fact, in refutation of the doctrines of Malthus, who maintains that the practice of destroying children has a direct tendency to augment population.

In 1774, when Captain Cook visited the island, he found it to contain 204,000 souls.¶ In less than thirty years after, this terrestrial paradise, blessed with a genial climate and a luxuriant soil, was reduced to 5000 inhabitants.** Turnbull relates, that "the missionaries made two tours whilst he was in the island, and in each of which they numbered the people; according to the first calculation they were 7000, but in the last they very little exceeded five."[*]

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* Buchanan's Researches in Asia, Eng. ed. p. 49. Ward's View of the History, Literature, &c. of the Hindoos. Also Moor's Hindu Infanticide, &c. Review of the same in Quarterly Review, vol. 6, p. 210.

† Buchanan's Researches in Asia, p. 49.

‡ Dr. Buchanan states, that two modes of putting the child to death, are principally prevalent. As soon as it is known to be a female, a piece of opium is put into its mouth; or the umbilical cord is drawn over its face, which, by preventing respiration, destroys it.—Researches in Asia, p. 47.

§ A high caste tribe, in Upper Bengal, poison all their female children with a mixture of opium and milk, to prevent the possibility of the family being disgraced, which can only occur by means of a female member of it. With the other natives of Bengal, the imolation of children is generally in fulfillment of a vow made by barren women, that in case Gunga (the river) will bless them with an offspring, they will sacrifice their eldest-born at his shrine; otherwise, the Hindoo women are as affectionate mothers as are to be met with in any country.—Editor.

‖ Turnbull's Voyage round the World, in 1800, 2, 3, and 4.

¶ Cook's second voyage, vol. 1, p. 349.

** Turnbull, vol. 3, p. 77.

It is not to be supposed that this enormous diminution of population is to be attributed solely to this cause; other causes have doubtless co-operated, particularly certain diseases, which prevail to a great extent, such as fevers, dysentery, phthisis pulmonalis, and scrofula.[†] All travellers, however, who have visited the island, concur in the opinion, that the effects of infanticide are infinitely more injurious to the population, than all the other causes combined.

The natives of *New South-Wales* resort to violent and unnatural compression of the body of the mother, in order to procure abortion. This process is called by them *Mee-bra.* Another practice, still more shocking, prevails, of burying a child with its mother, if she happens to die.[‡]

Among the *Hottentots,* infanticide appears to be a common crime. Barrow describes a race of them called *Bojesmans,* who destroy their offspring on various occasions; as "when they are in want of food; when the father of a child has forsaken its mother; or when obliged to fly from the boors and others; in which case they will strangle them, smother them, cast them away in the desert, or bury them alive."[§]

The *Mahometans* do not appear to attach any criminality to child-murder;[||] on the contrary, the very sources of honour and authority among them are polluted by it. Even the palace of the Sultan is constantly stained by the blood of infants. Thornton states, that the offspring of the younger princes of the royal family, who are kept in honorable confinement in the palace, are destroyed as soon as they are born.[¶] And Blacquiere accounts for the smallness of the number of children belonging to the Bashaw of Tripoli, from the fact of his encouraging his wives to evade their accouchements.[**]

Even in *Iceland,* we find traces of this inhuman crime. That island, which appeared in the distant horizon as a watch-tower of genius and learning, at a time when ignorance and superstition waved their triumphant banners over the prostrate glories of Europe; along whose majestic mountains, and in whose sacred retreats, poesy was still heard to sing, when her notes were lost at Athens and at Rome, and from whose shores eloquence continued to roll her thunders over the billows of the ocean, when her tongue was palsied in the forum and the senate; even in this island, so celebrated and so favoured, the detestable crime of exposing infants was at one time not prohibited. The custom appears to have been derived from their Norwegian ancestors, among whom it continued to prevail for nearly one hundred years after it had been abolished in Iceland. It became extinct shortly after the introduction of Christianity into the island, which event took place at the end of the tenth century.*

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[*] Turnbull, vol. 3, p. 778. [†] Edin. Med. & Surg. Jour. vol. 2, p. 284—90.

[‡] Collins' account of the colony of New-South-Wales, p. 124, 5. Edin. Review, vol. 2, p. 34.

[§] Barrow's account of a journey in Africa, in 1801 and 2, p. 378, 9.

[||] It is proper to state, that the Koran forbids it; and in the oath which Mahomet required of the women who joined his party, called the "women's oath," the prohibition of infanticide was distinctly mentioned.—Buck's Theol. Dict. Art. MAHOMET.

[¶] The present state of Turkey, &c. by T. Thornton, Esq. vol. 1, p. 120.

[**] Letters from the Mediterranean, by E. Blacquiere, Esq. vol. 1, p. 90.

If we turn our attention from the OLD WORLD, and direct it to the NEW, we shall find this crime presenting itself under forms no less horrible and disgusting.

Among the natives about *Hudson's Bay*, it is common for the women to procure abortion by the use of a certain herb which grows there.†

In *Labrador*, the Moravian missionaries, who first landed there, found it a prevailing custom to put to death their widows and orphans; not to gratify a natural ferocity of disposition, but merely on account of a supposed inability to provide the means of support for the helpless orphan, or the desolate widow of another. By the exertions of the missionaries, the practice was arrested.‡

Nor were the savages of these inclement regions the only people who were guilty of this horrid crime. The gloomy superstition of the *Mexicans* delighted in human sacrifices, and the altars of their divinities were continually drenched with the blood of infants and of men.§ The number of these sacrifices has doubtless been exaggerated; but the fact is unquestionable, that countless victims poured forth their lives to appease or conciliate their imaginary deities.

The mothers in *California* are described as voluntarily destroying their offspring. Venegas states, that the common cause of it was a scarcity of food, and that the practice was put a stop to by the father Salva-Tierra, who ordered a double allowance to be given to women newly delivered.‖

Charlevoix describes a race of savages in North America, who make a practice of destroying all infants who are so unfortunate as to lose their mothers before they are weaned; at the same time, they inter alive all the other children, upon the plea that no other female can nurse them properly.¶

The *Peruvians*, whom Dr. Robertson eulogizes for the mildness of their manners, and the benevolent spirit of their religion,** were nevertheless in the habit of sacrificing children.* Acosta tells us, that in such cases as the sickness of the Inca, or doubtful success in war and other affairs, ten children were sacrificed; and upon the coronation of the Inca, 200 were offered up. When a Peruvian father was taken sick, he sacrificed his son to *Viriachocha*, (the sun) beseeching him to accept of the life of his child, and to save his own. The same writer, when comparing the Peruvians and Mexicans, describes the former as exceeding the latter in the sacrificing of *children*, while the latter were chiefly addicted to the sacrifice of *men* taken in battle, of whom they murdered an immense number. Robertson endeavours to rescue them from this charge, by invalidating the testimony of Acosta. He cannot, however, help confessing that the practice did prevail among "their uncivilized ancestors;" but he adds, "that it was totally abolished by the Incas, and that no human victim was ever offered in any temple of the sun." He admits, moreover, that "in one of their festivals, the Peruvians offered cakes of bread moistened with blood drawn from the arms, the eyebrows, and noses of their children. This rite may have been derived," he says, "from the ancient practice in their uncivilized state, of sacrificing human victims."*

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* Dr. Holland's Preliminary Dissertation on the History and Literature of Iceland, in Sir G. Mackenzie's Travels. Edin. 2d ed. p. 39.

† Ellis' Voyage to Hudson's Bay, p. 198.

‡ Barrow's Account of a Journey in Africa, in 1801 and 2. Edinburgh Review, vol. 8, p. 438.

§ Robertson's History of America, vol. 3, p. 325.

‖ Hist. of California, by Miguel Venegas. Lond. 1759, vol. I, p. 82.

¶ Journal d'un Voyage à l'Amerique Septentrionale, par le P. De Charlevoix, a Paris, 1744, vol. 3, p. 368.

** History of America, vol. 3, p. 335.

Besides those that have been enumerated, travellers record the names of other tribes and nations inhabiting this vast continent, who murder their children with impunity and without remorse. They tell us of the *Abiponians*, a migratory race, inhabiting the province of Chaco in Paraguay, among whom, mothers have been known to destroy all their children as soon as they were born.† And of the *Araucanians*, a powerful nation of Chili, who permits fathers and husbands to kill their children and wives.‡

But it is unnecessary to extend this sketch any further. Enough has been recorded to give a view of the wide-spread desolations of this unnatural crime; certainly, too much for the honour of human nature.§

2. *Of the murder of the fœtus in utero, or criminal abortion, embracing an account of its proofs and causes.*

By INFANTICIDE, in its most extensive signification, is understood, the *criminal destruction of the fœtus in utero, or of the child after it is born.* Under this enlarged view, I propose to discuss it at the present time.

Of the murder of the fœtus in utero. Before proceeding to any enquiry into the *signs* by which it may be known that fatal violence has been done to the fœtus in utero, it becomes necessary to settle a preliminary question of much importance, which is to ascertain the period of gestation when the fœtus is to be considered as endowed with life.

In reviewing the various opinions which have been advanced on this subject, at different periods, it will abundantly appear, that too often fancy has usurped the prerogative of reason, and idle speculation been substituted in the place of rational investigation. The consequence has been, that doctrines have been promulgated, not only the most erroneous and absurd in their nature, but the most dangerous in their tendencies, to the happiness of individuals, and to the best interests of society.

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* History of America, vol. 3, p. 429.

† Edin. Encyclop. Art. ABIPONIANS. ‡ Ibid. Art. AMERICA.

§ To the honour of our North American Indians, it deserves to be mentioned, that they are not known to be guilty of this horrid crime. Mr. Heckewelder, in his interesting account of the Indians who inhabited Pennsylvania and the neighbouring states, says, "I have never heard of any nation or tribe of Indians who destroyed their children when distorted or deformed, whether they were born so, or came to be so afterwards."—Page 216.

The ancients were by far the most extravagant in their notions on this subject. The same fundamental error, however, pervaded all their theories. They believed that the sentient and vital principle was not infused into the fœtus, until some time after conception had taken place. It is not surprising that the exact time at which this union is effected, could never be satisfactorily settled by them. According to *Hippocrates*, the male fœtus became animated in thirty days after conception, while the female required forty-two.* In another part of his works he asserts, that this does not occur until the perfect organization of the fœtus.

The *Stoics* believed that the soul was not united to the body before the act of respiration; and consequently, that the fœtus was inanimate during the whole period of utero-gestation.† This doctrine prevailed until the reigns of Antoninus and Severus, when it gave way to the more popular sentiments of the sect of the *Academy*, who maintained, that the fœtus became animated at a certain period of gestation. The *Canon Law* of the church of Rome also distinguished between the animate and inanimate fœtus, and punished the destruction of the former with the same severity as homicide.‡

Galen considers the animation of the fœtus to take place on the fortieth day after conception, at the same time that he supposed the fœtus to become organized.§

Others believed shorter periods sufficient, and accordingly three days and seven have respectively had their advocates.|| Another contends, that eighty days are requisite for the animation of the female, while only forty are necessary for the male.¶ Some advocate forty days as sufficient for both.** Others again make a distinction between the imperfect embryo and the perfectly-formed fœtus, and consider abortion of the latter as a crime deserving the same punishment as homicide—a distinction, of which it is justly remarked by a celebrated writer on medical jurisprudence, "ennemie de la morale et de l'humanité, digne de l'ignorance et des préjugés de ses auteurs."††

Amidst these discordant sentiments, Zacchias offers himself as a mediator, and proposes sixty days as the limit, and recommends that any one who should cause an abortion after that period, whether of male or female, should be punished for homicide.‡‡

All the foregoing opinions, wholly unsupported either by argument or experiment, might be dismissed without a comment, were it not to

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* Lib. de Nat. Puer. Num. 10.

† Plutarch's Morals, vol. 3, p. 230, Lond.

‡ P. Zacchiæ Quæst. Med. Leg. lib. ix, tit. 1, 2, 5, p. 744.

§ Opera Galeni, de Usu Part. lib. 15, cap. 5. Lugduni, 1643.

|| Zacchiæ, lib. 1, tit. 2, q. x. p. 82.

¶ Ibid.

** Ibid. lib. 1, tit. 2, q. x. p. 82.

†† Foderè, vol. 4, p. 484.

‡‡ Ibid. lib. 1, tit. 2, q. x, p. 83.

point out the evils to which they have given rise. It may be said of them, with perfect truth, that their direct tendency has been to countenance, rather than to encourage abortion, at least in the earlier stages of pregnancy. On a subject of this nature, it was to be supposed that legal decisions would be influenced in a great measure by the opinions of philosophers and physiologists; and, accordingly, while the delusion of the Stoics continued its sway, the law could view nothing very criminal in wilful abortion,* as the fœtus was considered merely portio viscerum matris.† And afterwards, when the Academicians flourished, punishments very different, in the degree of their severity, were inflicted, according as the abortion was supposed to be that of an animate or inanimate fœtus.‡

In modern times, an error no less absurd, and attended with consequences equally injurious, has received the sanction, not merely of popular belief, but even of the laws of most civilized countries. The error consists in denying to the fœtus any vitality until after the time of quickening. The codes of almost every civilized nation have this principle incorporated into them; and, accordingly, the punishment which they denounce against abortion procured after quickening, is much severer than before. The *English law* "considers life not to commence before the infant is able to stir in its mother's womb."§ The *law of Scotland*, adopting the creed of the Stoics, believes the fœtus in utero, previous to quickening, to be merely pars viscerum matris. In *Saxony*, in consequence of the disputes of medical men on this subject, it was formerly decided, that the fœtus might be esteemed alive after the half of pregnancy had gone by.||

The absurdity of the principle upon which these distinctions are founded, is of easy demonstration. The fœtus, previous to the time of quickening, must be either dead or alive. Now, that it is not the former is most evident from neither putrefaction nor decomposion taking place, which would be the inevitable consequences of an extinction of the vital principle. To say that the connexion with the mother prevents this, is wholly untenable: facts are opposed to it. Fœtuses do actually die in the uterus before quickening, and then all the signs of death are present. The embryo, therefore, before that crisis, must be in a state different from that of death, and this can be no other than life.

But if the fœtus enjoys life at so early a period, it may be asked, why no indications of it are given before the time at which quickening generally takes place? To this it may be answered, that the absence of any consciousness on the part of the mother, relative to the motions of the child, is no proof whatever that such motions do not exist.—It is a well-known fact, that, in the earlier part of pregnancy, the quantity of the liquor amnii is much greater in porportion to the size of the fœtus, than at subsequent periods. It is not, therefore, rational to

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* Foderè, vol. 4, p. 382.

† Plutarch's Morals, vol. 3, p. 230.

‡ Foderè, vol. 4, p. 382.

§ Blackstone, vol. 1, p. 129.

|| Specimen Juridicum Inaugurale, p. 46. Auctore Van Visvliet. Lugduni Batavorum, 1760.

suppose, that the embryo may at first float in the waters without the mother being conscious of its movements; but that afterwards, when it has increased in bulk, and the waters are diminished in proportion, it should make distinct and perceptible impressions upon the uterus? Besides, it should not be forgotten, that fœtal life at first must of necessity be extremely feeble, and therefore it ought not to be considered strange that muscular action should also be proportionably weak.

But granting, for the sake of argument, that the fœtus does not stir previously to quickening, what does the whole objection amount to? Why, only that one evidence of vitality, viz. motion, is wanting; and we need not be told that this sign is not essential to the existence of life.*

The *incompleteness* of the embryo previous to quickening, is no objection to its *vitality*. Life does not depend upon a complication of organs; on the contrary, it is found that some of the simplest animals, as the polypi, are the most tenacious of life. Besides, upon this principle, vitality must be denied to the child after birth, because many of its bones, as well as other parts of its body, are imperfect.

Nor is the *want of organic action* any argument against this doctrine. Life appears to depend essentially as little upon organic action, as it does upon a complication of organs. If it did, the fœtus, after quickening, would be just as destitute of life as before, for its brain, lungs, stomach, and intestinal canal, perform no more action at the eighth month than they do at the third. But if organic action be essential to life, how are we to account for those singular cases of fœtuses born alive, and yet destitute of some of the most important organs in the body, such as the head, brain, &c?† and how are we to explain those temporary suspensions of organic action in the bodies of adults, which sometimes happen, without the principle of life being extinguished?

The observations of physiologists tend also to prove the vitality of the fœtus previously to quickening. According to Richerand,‡ blood is perceived about the seventeenth day after conception, together with the pulsation of the heart, and not long after the different organs have commenced their developement. The correctness of this statement is confirmed by the observations of Blumenbach, Magendie, and others. Mauriceau relates, that he saw a fœtus of about ten weeks that was alive, moved its arms and legs, and opened its mouth.§ Haller, indeed, asserted, "that all the viscera and bones of the future fœtus, nearly fluid indeed, and therefore invisible, were performed before conception in the maternal germ." However objectionable such an opinion may be, yet the fact is certain, that *the fœtus enjoys life long before the sensation of quickening is felt by the mother.* Indeed, no other doctrine appears to be consonant with reason or physiology, but that which admits the embryo to possess vitality from the very moment of conception.

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* There is a difference of opinion as to the real nature of quickening. It has been lately suggested by a writer, that it is altogether independent of any motion of the child, and that it is to be attributed to the sudden rising of the uterus out of the pelvic cavity into the abdomen. (London Med. and Phys. Journal, vol. 27, p. 441.) If this opinion be true, it would afford another incontrovertible argument in favour of the position which I have advocated.

† Saumarez' Physiology, vol. 2, p. 21. Review of Sir E. Home's paper on the Functions of the Brain. Edin. Review, vol. 24, p. 439.

‡ Richerand's Physiology, p. 539. Am. ed. § Burton's Midwifery, p. 88.

If physiology and reason justify the position just laid down, we must consider those laws which treat with less severity the crime of producing abortion, at an early period of gestation, as immoral and unjust. They tempt to the perpetration of the same crime at one time, which at another they punish with death. In the language of the admirable PERCIVAL, " to extinguish the first spark of life, is a crime of the same nature, both against our Maker and society, as to destroy an infant, a child, or a man : these regular and successive stages of existence being the ordinances of God, subject alone to his divine will, and appointed by sovereign wisdom and goodness, as the exclusive means of preserving the race, and multiplying the enjoyments of mankind."*

Proofs of abortion derived from an examination of the mother. In the early months of pregnancy, it is extremely difficult to ascertain whether an abortion has taken place or not. The fœtus has scarcely had time to make those firm attachments which afterwards unite it to the womb, nor has it attained to a sufficient size to effect these general changes in the constitution of the mother, nor those local alterations from the distention of the uterus and abdomen, which are afterwards produced. Its separation is, therefore, unattended by violence, and leaves but faint, if any traces of its previous existence. The hæmorrhage attending it is also of small consequence, as the uterine vessels have not yet sustained any particular enlargement, and therefore speedily contract.

In abortions at the middle or end of pregnancy, this obscurity does not attend us. The characteristics are then sufficiently evident for our guidance. There is considerable hæmorrhage from the enlarged vessels of the uterus previously to the contraction of the womb—there is an offensive discharge of blood and mucus from the vagina, distinguished from the menstrual flux by this circumstance, and by its longer continuance ; the menses continuing usually only three or four days, while the lochia do not cease flowing under seven or eight—the vagina is considerably dilated, and the os uteri open—the labia are red, soft, and inflated—the breasts are swollen, and milk flows from them—the areolæ of the nipples are larger and darker-coloured than usual—and the abdomen is flaccid, rugous, and pendulous.†

If the abortion ends in the death of the mother, it may sometimes be necessary to settle the point after her death, as in cases where another person is accused of having procured it by the administration of medicines, &c. which may have caused not only the death of the child, but also of the mother. The following appearances will be recognized on dissection :

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* Percival's Works, vol. 2, p. 430-1.

† Zacchias' Quæst. Med. Leg. Foderè. Brendelius. Burns' Midwifery. Male's Med. Jurisprudence, and Dr. Stringham's MS. Notes on Legal Medicine.

In the early months, no extraordinary appearances are to be detected, as the fœtus was expelled perhaps before the placenta was at all, or very slightly, attached to the uterus, so that its separation would leave no visible mark, and, from its smallness, it had caused no distention nor thickening of the uterus. But at a later period, the uterus is found enlarged and thickened—its muscular fibres are more evident, and its blood-vessels and lymphatics much augmented in size—a rough surface is found where the placenta has been attached—the cervix uteri is relaxed, and the vagina considerably dilated—the ligamenta rotunda are relaxed, and the ligamenta lata nearly effaced, as they furnish the uterus with its external covering. Upon examining the ovaria, if it be done a short time after the ovium has escaped from them, a *corpus luteum* is generally found, which vanishes soon after, but leaves a scar for life.

Such are the evidences furnished by dissection; and where they are found, afford incontestible proof of the previous existence of a fœtus in the uterus. I know that objections have been urged against their validity. A late English writer on this subject, says, " that the distention of the uterus might arise from hydatids, or moles, and the inequality of its internal surface, occasioned by their attachment."* Let us examine this objection for a moment. That the enlargement of the uterus, the relaxation of the cervix uteri and ligamenta rotunda, as well as the obliteration of the ligamenta lata, may be occasioned by the causes here assigned, will not admit of any dispute ; but the other phenomena cannot possibly be explained, unless by admitting pregnancy to be the cause. Hydatids, although not of frequent occurrence, are sometimes found in the uterus, but they can never occasion the placental mark, nor the preternatural enlargement of the uterine vessels. This will appear obvious from the following facts: The placental surface is between four and five inches in diameter. Now, if any degree of credit is to be attached to the descriptions of hydatids given by distinguished physicians, they are never attached by so extensive a surface. Dr. Denman describes them in the following manner: " Hydatids, or small vesicles, hung together in clusters from *one common stem*, and containing a watery fluid, are sometimes formed in the cavity of the uterus."† According to Dr. Baillie, " they consist of vesicles of a round or oval shape, with *a narrow stalk to each, by which they adhere to the outside of one another.* Some of these hydatids are as large as a walnut, and others as small as a pin's head. A large hydatid has generally a number of small hydatids adhering to it by a *narrow process.*"‡ From these descriptions, it is obvious that the surface caused by the attachment of hydatids to the uterus, must be very different from that of the placenta. It would, indeed, be absurd to imagine that this *narrow stalk* could be of such magnitude as to have a diameter of four or five inches. No less absurd is it to suppose that hydatids can cause such an enlargement of the uterine vessel as takes place in cases of pregnancy; for, from their very constitution, they cannot require any thing like the quantity of blood which is necessary to support the growth of a fœtus.

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* Male, p. 120.

† Introduction to the Practice of Midwifery, p. 146. Am. ed.

‡ Morbid Anatomy, p. 186. Am. ed.

With regard to the *corpora lutea,*[*] the recent observations of Sir Everard Home and others, have shown that they do occasionally exist in the virgin state. Taken alone, therefore, they are not to be considered as conclusive evidence of previous impregnation. When supported, however, by the other signs which have been enumerated, they must certainly be admitted as corroborative of the fact.[†]

The preceding observations will apply also to moles, although not with equal force. But in all cases of this kind, where the symptoms of pregnancy are said to arise either from moles or hydatids, it is reasonably to be expected that they should be produced in evidence. If they are not, this very fact would justify more than a *suspicion of* guilt; for no other cause could be assigned for the concealment of a circumstance which would at once place the innocence of the accused upon an unshaken basis.

Such are the *signs* by which an abortion may be recognized. Nothing, however, can be learned from them as to the cause of it, for the symptoms of voluntary and involuntary abortion are precisely the same.

A physician, when called to a case of abortion, is usually directed by practical writers, to make his examinations as speedily as possible after the event is supposed to have taken place, as all the parts from which any inference can be drawn soon return to their natural dimensions, and then all the signs become obscured. The time in which this takes place is variously stated. According to Zacchias, the signs are most conspicuous during the first *ten days,* and, after that, they gradually diminish to the fortieth.[‡] Burns says, it is a month after delivery, at least, before the womb returns to its unimpregnated state.[§] Dr. Bostock states, that the complete contraction seldom takes place "in less than eighteen days, and it is often more."[‖]

Of the causes of abortion. The practice of causing abortion is resorted to by unmarried females, who, through imprudence or misfortune, have become pregnant, to avoid the disgrace which would attach to them from having a living child; and sometimes it is even employed by married women, to obviate a repetition of peculiarly severe labour-pains, which they may have previously suffered. But abortion is not always associated with crime and disgrace; it may arise from causes perfectly natural, and altogether beyond the controul of the female. The physician should therefore be extremely cautious in his proceedings, even in cases of illegitimate pregnancy, and where the voice of popular prejudice seems to call upon the medical witness merely to confirm its previous, and often false decisions. The causes capable of producing abortion are various. They all, however, appear to act upon the same general principle, viz. that of interrupting the process of gestation, and exciting the uterus to premature contraction upon its contents, so as to expel them. The *criminal means* which have been resorted to for the purpose of accomplishing this object, may be divided into two classes, viz. the general and local. In the first class, are repeated venesection, drastic purges, emetics, diuretics, emmenagogues, &c. All of these act primarily upon the general constitution of the mother, and produce their effects upon the uterus, only in consequence of the sympathy existing between it and the other parts of the system. Hence it has been remarked by practical observers, that all of them will fail in producing the intended effect, unless used to such an extent as at the same time to endanger the life of the mother, or unless she labours under a previous predisposition to abortion. With the view of more especially illustrating and enforcing this fact, I shall enter into an examination of some of the means which have been used to procure abortion.

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[*] See note, p. 104.—EDITOR.

[†] The signs of impregnation and delivery have been so fully discussed, from page 99 to page 104 of this work, that I deem it unnecessary to enter into further details.

[‡] Quæst. Med. Leg. lib. iii. tit. 2, q. ix. p. 303.

[§] Burns' Midwifery, p. 315.

[‖] Vindication of the medical witnesses on the trial of C. Angus, Esq. for the murder of Miss Burns. Liverpool, 1808.

Venesection. Hippocrates, if he did not originate, certainly sanctioned the opinion, that the loss of blood, during pregnancy, was a certain means of destroying the fœtus.* Countenanced by such high authority, it is not surprising that the opinion should have been universally received, and that venesection should have become one of the popular methods for procuring abortion. Notwithstanding this, experience, the most ample and satisfactory, has proved conclusively, that, except in particular states of the constitution, venesection, however repeated and copious, can have no direct effect upon the fœtus; and, further, that in very many cases it is the most effectual agent in averting abortion. Mauriceau relates the history of two pregnant women, who were delivered at the full period, although one of them had been bled forty-eight times, and the other ninety times, for an inflammation of the chest.†

Dr. Rush, in speaking of the effects of purging and *bleeding* in the yellow fever of 1793, asserts, that not one pregnant woman to whom he prescribed them died, or suffered abortion.‡ In his defence of blood-letting, the same writer gives us the account of one woman whom he bled eleven times in seven days, during her pregnancy—of another, who was bled thirteen times, and of a third who was bled sixteen times while in the same condition. All these women, he adds, recovered, and the children they carried during their illness were born alive and in good health.§ The foregoing facts, selected from a multitude of similar character, are abundantly sufficient to show the extent to which venesection may be carried during pregnancy, without being attended with any injurious consequences to the fœtus; and the effect must be the same, from whatever part of the body the blood may be drawn, whether from the arm or the foot. Still it is not to be denied, that when the constitution of the mother is naturally feeble and irritable, or has become much debilitated by disease, an injudicious loss of blood, during pregnancy, may prove fatal to the life of the fœtus. In all cases, therefore, of this kind, every attendant circumstance should be duly considered, for the purpose of ascertaining the intention of the person who recommended it.

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* Mulier uterum ferens abortit secta vena, eoque magis, si sit fœtus grandior. Hippocrates, sect. 5. aphor. 31.

† Capuron, p. 307.

‡ Med. Obs. and Inqs. vol. 3. p. 309.

§ Ibid. vol. 4, p. 302.

Cathartics and emetics. The remarks just made concerning the effects of venesection, are equally applicable to cathartics and emetics. They may or may not produce abortion, according to the nature of the articles—the doses in which they are administered—the length of time they are continued, and the actual condition of the mother at the time of taking them. If the substances which are given be very powerful and drastic in their operation—if the doses be large, and these often repeated, and especially, if all this is done in a woman naturally weak and irritable, or enfeebled by disease, there can be no question that abortion may be accomplished. In such a case as this, however, the death of the mother is perhaps much more certain than the destruction of the child. With regard to the use of ordinary cathartic medicines during pregnancy, it is well ascertained that they may be carried to a great extent, without being followed by any injurious consequences either to the mother or the fœtus. During the yellow fever of 1793, Dr. Rush informs us, that he gave large and repeated purges of calomel and jalap to many women in every stage of pregnancy, and in no case did any injury ensue to the child. Nay, he adds, that out of a great number of pregnant women whom he attended in this fever, he "did not lose one to whom he gave this medicine, nor did any of them suffer an abortion. One of them had twice miscarried in the course of the two or three last years of her life. She bore a healthy child three months after her recovery from the yellow fever."* From the well-known fact, that many women are troubled with distressing nausea and vomiting during the whole of their pregnancy, and yet are safely delivered of living children at the regular period, we should not be led to conclude that much danger could ensue from the use of emetics. The fact, however, seems to be, that although the vomiting attendant upon pregnancy very seldom produces an abortion, yet the vomiting which is induced by emetics is occasionally attended with the most fatal consequences. In this opinion I am supported by the high authority of Mr. Burns, who says, that "it is worthy of remark, that abortion is very seldom occasioned by this cause, (the vomiting of pregnancy,) though emetics are apt to produce it."†

Diuretics have also been considered as capable of producing abortion, and have frequently been used for this purpose. That they may have been occasionally attended with success is very possible; but I have no doubt that, generally speaking, they have failed. They certainly are destitute of any specific power of exciting uterine action. Mr. Burns seems to think that they are capable of bringing on abortion, and accordingly advises that they should be avoided during pregnancy.* Still, from his own language, I should not infer that he had ever witnessed this effect, although, he says, he has seen diuretics given very freely to pregnant women labouring under ascites.† On the other hand, there are many positive facts on record, to prove, that diuretics may be taken with impunity by pregnant women. Zacchias relates the case of a female who, after an interval of five years, considered herself pregnant, and shortly afterwards was attacked with sciatica. Several physicians and midwives were called to examine her, and decided unanimously, that she was not pregnant, particularly as she lost a little blood every month, though not so much as in menstruation. They therefore prescribed for the disease which afflicted her, bled her repeatedly in the foot, administered purgatives frequently, together with diuretics and sudorifics. All this did not prevent her from bringing forth a healthy child at the end of the expected time.‡

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* Med. Obs. and Inq. vol. 3, p. 249.

† Principles of Midwifery, 5th ed. p. 207.

Concerning the *Oil of Juniper*, Foderè relates the following fact, which shows that this powerful article has failed in effecting an abortion. A pregnant female took every morning, for twenty days, one hundred drops of the distilled oil of juniper, without injury, and was delivered of a living child at the expiration of the ordinary term.§

Even *Cantharides* has been taken in very large doses, with a view of procuring an abortion, without accomplishing the desired effect. "Some years ago," says Mr. James Lucas, one of the surgeons of the general infirmary at Leeds, "I was called to a patient, who had taken about a drachm of powdered cantharides, in order to induce abortion, and which brought on frequent vomiting, violent spurious pains, a tenesmus and immoderate diuresis, succeeded by an acute fever, which reduced her to extreme weakness, yet no signs of miscarriage appeared, and about five months afterwards she was delivered of a healthy child."‖

Emmenagogues. This is a class of medicines supposed to act specifically upon the uterus, in promoting the menstrual flux. From the uncertainty attending the operation of most of the articles usually arranged under this head, their number has been much diminished of late by systematic writers on the materia medica. Indeed, it may be questioned, whether the number of articles which exercise a specific influence on the uterus, exceed two or three. Of those generally classified under this head, I shall only notice *ergot*, *mercury*, and *savine*.

Secale cornutum, ergot or spurred rye. This article, at present so fashionable in obstetric practice, was first announced to the profession, in this country, in the year 1807, by Dr. John Stearns, of New-York, as a substance capable of accelerating, in an extraordinary manner, the process of parturition. As might naturally be expected from the announcement of a remedy so novel and unique, it excited much interest, and as soon as subsequent experience had confirmed its virtues, rose at once into the most unlimited popularity. In the year 1812, it was suggested by the editors of the New-England Journal of Medicine and Surgery, that while fully convinced of the parturient powers of the ergot, they were apprehensive that an evil of great magnitude not unfrequently resulted from its use, and that was, the death of the child. They stated, that they had been led to this apprehension from "observing, that in a large proportion of cases, where the ergot was employed, the children did not respire for an unusual length of time after the birth, and in several cases the children were irrecoverably dead."[*] The observations of numbers of highly-respectable physicians, since that period, have tended but too strikingly to confirm this melancholy fact. At present, it will scarcely be denied by any one acquainted with the operation of ergot, that if given in very large doses, or at improper periods, it will but too certainly prove detrimental to the life of the child.[†] It is to be feared, that for this purpose it has been but too frequently used in this country. It cannot, therefore, be too strongly insisted upon, that the life of the mother is equally jeopardized with that of the child, by its improper use.[‡]

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* Principles of Midwifery, 5th edit. p. 268. † Ibid. p. 223.

‡ Foderè, vol. 4, p. 480. § Ibid.

‖ Memoirs of the Med. Society of London, vol. 9, p. 406.

Mercury has long been considered an article capable of occasioning abortion. Crude quicksilver was at one time supposed to possess this property. It was accordingly used, not merely for this purpose, but also in all cases of difficult labour. It was not long, however, before it was ascertained that large quantities of it might be taken by pregnant women, with perfect impunity. Matthiolus relates of several pregnant women, each of whom drank a pound of quicksilver to cause abortion, without any bad effect.[§] The same fact is confirmed by Fernelius.[‖] *Calomel*, however, is the preparation of mercury most generally supposed to exert a specific influence upon the uterine organs. That it possesses the power of producing miscarriage, is countenanced by the authority of Mr. Burns, who directs that a full course of mercury should be avoided during pregnancy.[*] Facts, however, both numerous and conclusive, are on record to prove, that a pregnant woman may go through a long course of mercury, without the least injury either to herself or to the child. Bartholin and Mauriceau relate several cases, in which mercury was given to salivation, to pregnant women affected with syphilis, and who all, at their full time, were safely delivered of healthy children.[†] Mr. Benjamin Bell, than whom I could not quote higher authority, says, "it is a prevailing opinion, that mercury is apt to occasion abortion, and it is therefore seldom given during pregnancy. Much experience, however," he adds, "has convinced me that this opinion is *not* well founded, and when managed with caution, that it may be given in sufficient quantities at every period of pregnancy, for curing every symptom of syphilis, and *without doing the least injury either to the mother or child.*"[‡] To the same effect is the testimony of Dr. Rush, concerning the use of calomel in the yellow fever of 1793. In not a single instance did it prove injurious to pregnant women.[§] A case which fell under my own care, in November, 1821, confirmed me in the opinion already advanced. A female, eight months gone with child, was attacked with a violent inflammation of the lungs. After the use of the ordinary depleting remedies, I found it adviseable to have recourse to mercury. She was accordingly put upon the use of small doses of calomel and James' powders. In a few days, salivation came on; after which, all the symptoms of her pulmonary complaint speedily vanished, and the patient was restored to her usual health. She was afterwards delivered of a living child, at the full period.

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[*] Vol. 1, p. 70.

[†] For ample testimony on this point, I refer to the following authorities: New-York Medical Repository, vol. 12, p. 344. Vol. 20, p. 11. Vol. 21, p. 23, 139. New-England Journal of Medicine and Surgery, vol. 1, p. 70. Vol. 2, p. 353. Vol. 5, 161. Vol. 7, 216. Vol. 8, 121. New-York Medical and Physical Journal, vol. 1, p. 205, 276. Vol. 2, p. 30. It does not fall within my province to lay down the rules necessary to be observed by accoucheurs in the use of ergot. I cannot, however, refrain from referring to a valuable paper on this subject, by Dr. Stearns, published in the New-York Med. and Phys. Journal, vol. 1, p. 278. It is calculated to be extensively useful, and it is to be hoped, that the instructions there laid down may have their just influence with the profession. For another interesting communication on ergot, from the pen of Dr. Hosack, the same journal may be consulted, vol. 1, p. 205.

[‡] Might not all this arise, to a certain extent, from its being employed only, or chiefly, in cases of difficult or protracted labour, where the child runs great risk at any rate?—EDITOR.

[§] James' Dispensatory.

[‖] Vidi mulieres qui libras ejus biberunt ut abortum facerent, et sine noxa Fernelius.—Francis on Mercury, p. 12.

Juniperus sabina—savine. If given in sufficiently large doses, this is a powerful poison. In the experiments made by Orfila on this article, it was found, in one instance, to destroy a dog in sixteen hours, and in another in thirteen hours after it was administered.[||] In the case of Miss Burns, for whose murder Mr. Angus was tried at Lancaster in 1808, there is reason to believe, from the testimony offered, that savine oil had been administered to effect an abortion. That it does not always succeed, is evident from a case related by Foderè. In 1790, a poor, imbecile, and cachectic girl, in the duchy of Aoust, in the seventh month of her pregnancy, took from the hands of her seducer a glass of wine, in which there was mixed a large dose of powdered savine. She became so ill, that a report of it was made to the magistrate, who ordered Foderè to visit her. The patient stated to him, that on taking the drug, she had felt a burning heat, accompanied with hiccup and vomiting. This was followed by a violent fever, which continued for fifteen days. By the proper use of refrigerants, however, she recovered, and at the end of two months was safely delivered of a healthy child.[¶]

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[*] Midwifery, p. 263.

[†] Foderè, vol. 4, p. 429.

[‡] Bell on the Venereal, Am. ed. vol. 2, p. 265.

[§] Med. Obs. and Inq. vol. 3, p. 249, 309.

[||] Orfila, vol. 2, p. 36—7.

[¶] Foderè, vol. 4, p. 431.

Among the *local means* used for procuring abortion, I shall notice only two, viz. blows on the abdominal and lumbar region; and the introduction of an instrument into the womb, which, by rupturing the membranes, induces premature action of the uterus, and thus destroys the child.

Blows on the abdomen and loins. In cases where severe blows have been received on the back, the danger of abortion is always imminent. It is, indeed, rare that a female gets to her full time when she has received such an injury. Blows on the abdomen are equally dangerous; and, in most cases of this kind, a considerable hæmorrhage precedes the death of the fœtus. In disputed cases, where it is denied that the injury inflicted has caused the abortion, we should attend to the two following circumstances: First, whether the violence offered was sufficiently great to be considered as the sole cause; and second, whether the female was not predisposed to abortion, and had failed in some precautions, or committed some imprudence, which might have induced it. After investigating into these facts, we ought to enquire whether the accused knew of the pregnancy of the female, or whether she had not provoked the blows which she received. Two cases from Belloc may serve to illustrate these distinctions. A young woman, between the third and fourth months of her pregnancy, had received, from a robust man, several kicks, and blows with the fist, the marks of which were very evident. Immediately after the accident, she was put to bed, bled, and various remedies given her by a surgeon. The hæmorrhage, however, continued, with pains in the loins and abdomen, and on the next day she had an abortion. Belloc, on being examined, declared that the accident was owing to the violence which had been inflicted.* In another case, a female brought forth a dead fœtus, four months advanced, two days after a quarrel with her husband, in which she said he had struck her. Instead, however, of lying down, or at least keeping quiet, she walked a league that day, and on the next a quarter of a league, to a place where she was to aid in bringing in the harvest, nor was it until her arrival there that she was forced to go to bed. In this case Belloc decides, that it is very possible, had she remained quiet, and called for proper aid, that the abortion would not have taken place, particularly as the violence used was only that of throwing her down in the street.†

With regard to this cause of abortion, as well as the others that have been mentioned, it is to be understood that the life of the *mother* is equally exposed with that of the child. The following case, related by Dr. Smith, illustrates this fact in a striking manner, and is only one of a number which might be adduced. In 1811, a man was executed at Stafford for the murder of his wife. She was in the pregnant state, and he had attempted to induce abortion in the most violent manner, as by elbowing her in bed, rolling over her, &c. in which he succeeded—not only procuring abortion, but, along with it, the death of the unfortunate woman.‡

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* Belloc, p 81. † Belloc, p. 82. ‡ Smith, p. 305.

Of the mechanical means used to destroy the child. Of this villanous practice, which has long been known and resorted to for the nefarious purpose of abortion, I shall say nothing more than to give the history of a case in which it was used, and in which it proved fatal to the lives of both *mother* and *child*. "At Durham assizes, in 1781, Margaret Tinckler was indicted for the murder of Janet Parkinson, by inserting pieces of wood into her womb. The deceased took her bed on the 2d of July, and from that period thought she must die, making use of various expressions to that effect. She died on the 23d. During her illness, she declared that she was with child by a married man; and he, being fearful, should she be brought to bed, that the knowledge of the circumstance would reach his wife, advised her to go to the prisoner, who was a midwife, to take her advice how to get rid of the child—being at the time five or six months gone. The delivery took place on the 10th of July, three days previous to which, a person saw the deceased in the prisoner's bed-chamber, when the prisoner took her round the waist, and shook her in a violent manner, five or six different times, and tossed her up and down. She was afterwards delivered at the prisoner's house. The child was born alive, but died instantly, and it was proved by surgeons to be perfect. There was no doubt but that the deceased had died by the acceleration of the birth of the child; and, upon opening the womb of the mother, it appeared that there were two holes caused by wooden skewers, one of which was mortified, and the other inflamed. Additional symptoms of injury were also discovered."*

Having finished the notice which I proposed to take of the methods which have been resorted to for criminally producing abortion, I must again insist upon a circumstance, already adverted to, but which cannot be too often repeated, and this is, the danger which necessarily attends the life of the mother in every attempt of this sort. Even in cases where miscarriage results from involuntary causes, and where every prudential measure has been adopted for obviating its consequences, it is well known that the mother frequently falls a victim. How much more likely is this to be the result when the miscarriage is occasioned by great and unnatural violence done to the system, and that too under circumstances which generally shut out the wretched sufferer from the benefit of all medical succour. There is another circumstance also of great importance, which should not be forgotten. It has happened, in some instances, that while the mother has lost her life, in attempting to procure a miscarriage, the child has actually been born alive and survived. A case of this kind was witnessed by Foderè, in 1791. A cook finding herself pregnant, and not being longer able to conceal it, obtained half an ounce of powdered cantharides and mixed it with an ounce of sulphate of magnesia, and took them down, in order to produce abortion. Some hours after, she was seized with violent cholic, and brought forth a *living child*, in the most horrible pains. During the succeeding night she died.† If these facts were more generally known, I suspect the attempts at abortion would be much less frequent than they are at present. With regard to the accessaries and accomplices in this crime, it would be well for them to remember, that in every experiment of this kind which they make, they take upon themselves the awful responsibility of jeopardizing not merely a single life, but two lives. As far as *intention* is concerned, they are in all cases as much chargeable with the death of the mother, as with the destruction of the fruit of the womb.

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* East's Crown Law, vol. 1, p. 354. Smith, p. 306.

† Foderè, vol. 4, p. 436.

It results, therefore, from what has been said concerning the means of producing abortion,

1. That all of them are *uncertain* in their operation upon the fœtus,
2. That they always endanger the life of the mother, and
3. That they sometimes destroy the mother without affecting the fœtus.[*]

Of the involuntary causes of abortion. Of these, it is not necessary to say much. They should always, however, be kept in view in medico-legal investigations on this subject, so that we may not attribute to criminal interference what is owing to some morbid derangement. Diseases of various kinds, as rheumatism, pleurisy, small-pox, typhus and yellow fevers, scarlatina, syphilis, and meazles, operating on a system predisposed by nervous irritability—a diseased state of the uterus—the intemperate use of spirituous liquors—irritation of the neighbouring organs, from costiveness, tenesmus of dysentery, hæmorrhoids, prolapsus ani, diarrhœa, incontinence of urine—errors in regimen and diet—violent exercise, as in walking, dancing, riding, running, &c.—accidental falls—a sudden contortion or shock[†] of the body—indulgence of any violent passion of the mind, whether joyful or sad—the relation of any unexpected intelligence—a great noise[‡]—

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[*] I deem it so important to enforce these results, that I shall confirm them by the following authorities. "It is evident, I believe, from experience, that such things (abortives) cannot act as efficient causes, without the aid of those predisposing causes, or natural habits of the body, which are necessary to concur with them. As attempts of this kind, however, should not be passed off with impunity, and *as the life of the mother as well as the child* is endangered by such exhibitions, if advised by any other, they should be considered as highly culpable, and for this reason should be made known."—Farr's Elements of Medical Jurisprudence, p. 70.

"Every woman who attempts to promote abortion, *does it at the hazard of her life*. It may be remarked, whoever endeavours to counteract the ordinary proceeding of nature, will have in the end sufficient cause to repent the temerity."—Bartley's Treatise on Forensic Medicine, p. 5.

"There is no drug which will produce miscarriage in women not predisposed to it, *without acting violently on their system, and probably endangering their lives.*"—Male's Epitome of Juridical Medicine, in Cooper's Tracts, p. 208.

"Abortion is in general injurious to health, and is seldom unaccompanied with suffering. The administration of emmenagogues to force a separation of the ovum, where the constitution has no tendency to throw it off, *is highly dangerous to the mother*. No drugs can act in this way upon the uterus, but by involving it in a violent shock given to the general system. *It has frequently occurred, that the unhappy mother has herself been the sacrifice, while the object intended has not been accomplished.*"—Smith's Principles of Forensic Medicine, p. 295.

[†] The pulling of a tooth, for instance, has been known to produce abortion.—Burns on Abortion, p. 64.

[‡] A case, in which *a great noise* as a cause of miscarriage was involved, was tried in 1809, at the quarter-sessions of Franklin county, in Pennsylvania. The

the appearance of any extraordinary object—previous abortion—fluor albus—excessive venery—accidental blows on the abdomen—the death of the fœtus—the attachment of the placenta over the os uteri—retroversion of the womb—hæmorrhage, from whatever source, or at any period*—all or any of these causes may give rise to abortion, without the imputation of the least criminality to the female.

The influence of the passions upon the uterine functions is peculiarly striking. It is an extraordinary fact, that the melancholy and sadness caused by some great evil which is known and expected, are much less injurious to a pregnant woman, than the annunciation of some important good, or even a trifling misfortune which is unexpected. Foderè relates the case of some pregnant women, who, during the horrors of the French revolution, were confined in dungeons, and condemned to death; their execution was, however, delayed in consequence of the peculiarity of their situation. Yet, notwithstanding the actual wretchedness of their condition, and the more terrible anticipation of future suffering, they went on to the full time, during which period a fortunate change in the state of parties rescued them from unmerited punishment.†

Examination of the fœtus. In examining the expelled contents of the womb, we should have the following objects in view:

1. To ascertain whether it be really a fœtus. This is important, inasmuch as the presence of moles and hydatids in the uterus may occasion many of the symptoms of pregnancy. The necessary distinctions on this head have been explained in a previous chapter.‡

2. To ascertain the age of the fœtus. For ample directions on this point, consult from page 112 to page 119 of this work. Having discovered, as nearly as possible, the age of the fœtus, it should be compared with the symptoms detected on the examination of the mother, to see how they correspond.

3. To ascertain, if possible, what has been the *cause* of the miscarriage. If the abortion has been occasioned by the use of drugs, &c. taken by the mother, nothing can be learned as to the cause of it, whether it be voluntary or involuntary, from any examination of the fœtus. In all cases its appearance will be very much the same, whatever may have occasioned its expulsion from the womb. As, however, it may have been produced by mechanical violence done to

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indictment charged, that Taylor, (the defendant) unlawfully, *secretly*, and maliciously, with force and arms, broke and entered at night the dwelling-house of James Strain, with intent to disturb the peace of the commonwealth; and, after entering the house, unlawfully, wilfully, and turbulently *made a great noise*, in disturbance of the peace of the commonwealth, and did greatly misbehave in the said dwelling-house, and did greatly frighten and alarm the wife of the said Strain, whereby she *miscarried*, &c. The offence was held indictable as a *misdemeanor*. The jury found the defendant guilty; but the quarter-sessions arrested the judgment, upon the ground that the offence charged was not indictable. The supreme court decided in this case, that the judgment should be reversed, and the quarter-sessions were directed to proceed to give judgment against the defendant.—Binney's Reports, vol. 5, p. 277.

* Burton's Midwifery, p. 281. Burns' Midwifery, p. 161. Burns on Abortion. Hamilton's Midwifery.

† Foderè, vol. 4, p. 422.

‡ See page 84 of this work.

the fœtus itself, by the introduction of instruments, &c. it becomes necessary to examine it very carefully, and more especially its head, to discover the nature and extent of the wounds (if any) which may have been inflicted.

In concluding the subject of abortion, I shall make a remark or two upon the *circumstantial evidence* which may be adduced to prove the guilt of the accused. With regard to her concealing her pregnancy, I cannot conceive with what justice any inference can be drawn prejudicial to her character. If her pregnancy be the result of illicit commerce, it is perfectly natural that she should make use of every effort to conceal her disgrace as long as possible. The mere fact of concealment, even if proved, ought to be considered as no evidence whatever of her guilt.

If she has been known to apply frequently to the same or to different physicians to be bled, especially in the foot;—if she has endeavoured to procure any of the medicines usually given to produce this effect;—if any are found in her possession, or if she can be convicted of actually taking them, without medical advice, we have then the strongest circumstantial evidence which the nature of the case admits of, to pronounce her *intention* to have been criminal. These are circumstances, however, which do not strictly come under the cognizance of the professional witness; they are matters of fact, which must be decided upon from the testimony which may be offered by the other witnesses cited to appear in the case.

3. *Of the murder of the child after it is born, with an account of its various proofs and causes.*

In every case in which an infant is found dead, and becomes the subject of judicial investigation, the great questions which present themselves for inquiry are, 1. Was the child born alive? 2. If born alive, by what means did it come to its death?

Having come to the conclusion that the death of the child is owing to violence, it is next to be ascertained who the perpetrator of it is. Should suspicion light upon a female as being the mother of it, the questions to be determined concerning her are, 1. Whether she has been really pregnant? 2. Whether she has been delivered of a child; and 3. Whether the pregnancy and delivery correspond as to time, &c. with the appearances observed on the child? These are the only points upon which the *professional witness* can be called to give his testimony, and to the consideration of these I shall accordingly confine myself.

Proofs of the child having been born alive. We know nothing of the *nature* of *life:* we judge of it only from its effects, and declare that being as enjoying it, who performs the functions considered essential to it. These functions are called *vital*, and are usually enumerated as the three following, viz. the *cerebral* and *nervous;* the *sanguineous;* and the *respiratory*. This distribution can only apply, however, to the state after birth: in the fœtal state, facts would seem to prove, that nothing besides the *circulation* of the blood is necessary to the maintenance of the vital principle. Even the energy of the brain, which is afterwards to determine the character, and in a great measure to fix the destiny of the being it inhabits, is originally dormant, and the organ itself occasionally wanting. In cases of infanticide, it is only from the *circulation*, and *respiration*, that any thing is to be learned; the *brain* and *nerves* leave no trace of their influence behind them.

Proofs of the blood having circulated after birth. There are several circumstances from which a conclusion on this point may be drawn.

(a) Appearance of the blood. The difference between the blood of the fœtus, and the child after birth, has been particularly noticed by Bichat. He made numerous dissections of young guinea-pigs while yet in the womb of their mother, and he uniformly found the blood of the arteries and veins presenting the same appearance, resembling the venous blood of the adult. Not the slightest difference was observed between the blood taken from the aorta, and that from the vena cava—nor between that drawn from the carotid artery and the jugular vein. He made the same observations, in three experiments of a similar nature, upon the fœtuses of dogs. He also frequently dissected human fœtuses, who died in the womb, and found the same uniformity in the arterial and venous blood. From these facts, he concludes, that no difference exists between the arterial and venous blood of the fœtus, at least in external appearance.*

The chemical constitution of the blood of the fœtus appears also to differ from that of the child after birth, or the adult. Fourcroy, in analyzing it, found it destitute of fibrous matter, as well as of the phosphoric salts which are always detected in the blood of the adult. He also discovered, that it was incapable of becoming florid by exposure to the influence of atmospheric air.

These facts prove decidedly, that there is a difference between the blood of a child that dies in the womb, and one which is born alive and has respired; and this circumstance may be used as a criterion, by which to determine whether it was possessed of life after birth. I know not that this test has ever been introduced into medico-legal investigations, in cases of infanticide. Perhaps it is one too delicate to be altogether trusted, especially, as we have others more plain and obvious, and which may be more easily employed.

(b) The presence of blood in the pulmonary blood-vessels. It is well known, that before respiration takes place, scarcely any part of the blood of the fœtus passes through the lungs. The blood-vessels of these organs are therefore empty and collapsed. Immediately after respiration is established, the whole of the vital fluid circulates through the lungs, for the purposes of oxygenation. If, therefore, the pulmonary blood-vessels be found distended with blood, it is a proof, not merely that the blood has circulated after birth, but also that respiration has been actually performed.

(c) The changes which take place in the vascular system, immediately after respiration begins. These changes are highly important and interesting, and deserve particular attention. It is not necessary, in this place, to enter into an elaborate description of the fœtal circula-

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* Bichat's General Anatomy, translated by G. Hayward, M.D. vol. 1, p. 358.

tion. I shall only notice its prominent peculiarities. 1. The *ductus venosus* is a vessel running from the umbilical vein to the inferior vena cava, through which a portion of the blood passing through the umbilical vein goes directly to the cava, and thence to the heart. In the fœtus, this duct will be found pervious, and containing blood. In the child which has respired, on the contrary, it will be found collapsed, and empty of blood. The whole vessel, shortly after birth, becomes impervious, and is converted into a ligament. 2. The *ductus arteriosus* is a vessel which communicates between the pulmonary artery and the aorta, and conveys a portion of the blood from the former directly to the latter. In the fœtus, this passage will be found in a state similar to that of the ductus venosus—pervious, and with blood in it. In the child after birth, its passage becomes obliterated, and the duct itself changed into ligament. 3. *Foramen ovale.* This is an opening which, in the fœtus, constitutes a communication between the two auricles of the heart, and through it part of the blood is conveyed directly from the right to the left auricle. After birth this foramen is obliterated. Upon this latter peculiarity, however, too much reliance should not be placed, as not unfrequently a considerable period elapses before the foramen is completely closed.

(*d*) *Ecchymoses*, or *extravasations* of blood, on the body of the child produced by blows or other injuries, prove that it enjoyed vitality at the time they were inflicted; for, in a dead child, as the blood has ceased to circulate, it could not flow to the injured part, and therefore there would be no appearance of extravasation. Professor Mahon mentions another possible cause of such extravasations, which should not be overlooked. He says they may result from putrefaction, which, by means of the air that is generated, bursts the veins, and then blood from very distant parts of the body is insensibly carried along to this outlet, so as to form a considerable extravasation.* It could not certainly be very difficult to discriminate in a case of this kind, yet it teaches us a practical caution of some consequence, which is, to pay particular attention to those circumstances which tend to favour the process of putrefaction, as the climate, season of the year, and place where the body is found.

Proofs of the child having respired after birth. The act of respiration constitutes the great distinguishing feature between adult and fœtal life. Its commencement is succeeded by revolutions in the animal economy, the most wonderful and interesting. The pulmonary system is, however, principally affected by it, and it is there that the medico-legal inquirer must search for those changes which are indicative of the exercise of that function.

In examining a child which has never breathed, its *thorax* is found flattened, or, as it were, compressed—the lungs are dense, of a reddish brown colour, and in a collapsed state—they are comparatively small in size, occupying only the upper part of the chest, and hence they leave the heart and pericardium uncovered; on examining the pulmonary vessels, they are found to contain little or no blood. This will be evident on cutting into them. No hemorrhage will follow the incision. If the lungs be taken out of the thorax and put into water, they will sink to the bottom, and if their weight be compared with the weight of the whole body of the child, they will be found to be to each other as 1 is to 67 or 70.

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* Mahon, vol. 2, p. 389.

The reverse of all this is met with in a child that has respired. The thorax is more arched, and its size augmented in every respect; the lungs are dilated; they fill up the cavity of the thorax, and cover the lateral parts of the pericardium; their colour is less deep, and the pulmonary vessels are moreover distended with blood. An incision into them will be attended with a flow of blood. Their specific, as well as absolute weight, is also changed; and accordingly, when put into water, they will float upon its surface, and when compared with the whole weight of the body, they will be as 2 is to 67 or 70: or, in other words, the *absolute* weight of the lungs in a child that has breathed, will double that of the fœtus previous to respiration. In addition to this, they have an elastic feeling, and on cutting into them, there is a crepitus caused by the extrication of the air from the pulmonary cells.

Besides the effects thus produced upon the *lungs* themselves, by the admission of air into them, there are other changes effected in the neighbouring organs. The shape of the diaphragm is altered by the expansion of the lungs, pressing it down and diminishing its arch. And, from the same cause, the relative position of the liver and stomach will be changed.

Such, in general terms, are the changes in the pulmonary system caused by respiration, and where they exist, are sufficiently palpable to remove every doubt as to the child having enjoyed life. Some of them, however, require a more minute examination.

(a) Of the floating of the lungs in water. It is to Galen that we are indebted for the first notice of the changes effected in the lungs by respiration. "Ob eam causam," says he, "substantia carnis pulmonis ex rubra, gravi, densa, in albam, levem, ac raram transfertur."* The knowledge of this fact was not however applied to the purposes of forensic medicine until after the lapse of several centuries. It seems to have first attracted attention a little before the time of Morgagni, who says, "I do not know, whether any one ever thought of making the experiment on this account, except a few lustra before my age."† Even Zacchias and Parè, who may be styled the fathers of forensic medicine, pass it over in silence. Haller speaks of it particularly, and notices some of the difficulties attending its practical application: "Vixit certe puer, cujus pulmo aquis innatat, neque vitium subrepere potest, nisi vel in os inflatus ær fuerit, quod verum respirationis genus est, vel putredo, neque ea modica, tantum produxerit æris, ut pondus specificum pulmonis, aliunde equidem ære exigua portione majus, aquæ pondere minus factum sit. Id modica putredo non efficit, major præstat. Neque tunc error in medici effato locum habet, si levi opera voluerit explorare, num et reliqua viscera natent. Id si viderit, non os in pul-

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* Opera Galeni de usu Part. lib. xv. cap. 6, p. 145-6.

† Morgagni's Works, vol. 1, Lett. 19, p. 536.

monem per respirationem receptus causa erit natandi, sed aer ex humoribus carnibusque per communem legem putredinis expeditus."*

In the whole range of forensic medicine, there is not a question more important, and at the same time more difficult, than the one which relates to *the floating of the lungs as a proof of the child's having been born alive*. It has divided the opinions of medical jurists from the earliest periods, and even at the present day it still remains a subject of controversy. When it is recollected how great and just an importance has been attached to it in trials for child-murder, and how embarrassing to courts and to juries have been the contradictory sentiments advanced concerning it by medical witnesses, the propriety of a lengthened investigation of the subject cannot be questioned.†

For the purpose of rendering the subject as distinct as possible, I shall first state the test, and then consider the different objections which have been brought against its accuracy.

If the lungs of a child, which has never breathed, be put into water, it is found that they are specifically heavier than the water, and of course sink. On the contrary, if respiration has once taken place, the lungs being specifically lighter than water, will then float. From these facts the general conclusion necessarily follows, that when the lungs of a child float in water, it must have respired, and therefore must have been born alive. And, on the other hand, when they are found to sink, it is an evidence that the child has not breathed, and therefore was not born alive.

By the French this is denominated the *Hydrostatic test* of the lungs, a name both convenient and appropriate, and I shall therefore adopt it in the following discussion.

Let us now see whether it is safe to trust to the evidence furnished by this test, by considering the different objections which have been urged against it.

Examination of objections. I. It has been objected, that a child may have been born dead, and yet the lungs will float in water, from having undergone putrefaction; and, therefore, it is argued, that the mere floating of the lungs is no decisive proof of previous life.

With the view of giving this objection its full force, it may be proper first to consider the effects of putrefaction.

Strange as it may appear, it has nevertheless been a subject much debated, what the effects of putrefaction are upon lungs that have never respired; some asserting, that it renders them specifically heavier than water, and, consequently, that they will sink when thrown into that fluid; while others, of equal respectability, maintain a contrary opinion. Both parties adduce experiments in proof of their particular doctrines. The only solution that can be given to these contradictory results, is to admit that all the experiments have not been performed with sufficient care, so as lead to conclusions uniformly just. Every thing depends upon the *manner* in which they are conducted. The most accurate, I believe, were those performed by Mayer; and, as they place this subject in a very just point of view, and relieve it of much of the obscurity in which it has been involved, it may not be improper to present a summary of his observations. From a very extended series of experiments, continued during a number of years, and executed with the utmost care and precision, Mayer found, on putting into water the lungs of still-born children, in whom, of course, no sign of respiration or life had appeared, that they sunk to the bottom. After an interval of two or three days, the water in which they were left became turbid—the lungs changed in colour, and increased in volume—here and there an air-bubble arose to the surface of the water, and at the same time a putrid odour became perceptible. All these appearances continued to increase daily, until the sixth, seventh, or, at the latest, the eighth day, when the lungs, both entire and cut into pieces, floated in the water in which they became putrid. On transferring the lungs to vessels containing clean water, they still continued to float, although, on the slightest compression, they instantly sunk.

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* Haller, vol. 8, p. 279, 80.

† With the exception of the late writers, the English were very generally opposed to it. Indeed, so strongly had this opposition been expressed by writers and practitioners, that all evidence drawn from this source, if not immediately rejected in their courts of justice, was at least looked upon with the greatest suspicion. The French and Germans have made it the subject of more profound inquiry. Many of their first writers advocate its accuracy; and in their trials for infanticide, much weight is attached to it.

Lungs placed in water, and exposed to the rays of the sun, swam on the sixth day. If they were suffered to putrefy where there was a free current of air, they rarely floated before the tenth or eleventh day. After the lungs had once floated they remained in that state, emitting daily a more offensive odour, and acquiring an increased volume, until the twenty-first, or, at the latest, the thirty-fifth day. After that period they gradually sunk down, without a single exception, to the bottom of the vessel, nor did they afterwards betray any disposition to float, although kept for seven weeks, and in some instances a much greater length of time.*

The foregoing experiments were made in the month of August. The lungs, both entire and cut into sections, were immersed in pure fountain water, and contained in vessels convenient and capacious. In short, every precaution seems to have been scrupulously observed, to render the experiments accurate and satisfactory.

My own experiments on this subject, although not numerous, go to confirm, in every essential point, those which have been just detailed. I shall content myself with recording the history of a single one.

Twenty-four hours after delivery, I was favoured by a medical friend with the thoracic viscera of an infant, which had been still-born, after a very difficult and protracted labour. On putting them into a vessel of water, the heart, lungs, thymus gland, &c. were found to sink readily to the bottom, both conjointly and when separated. No symptom of putrefaction was discernible. August 20, 9 o'clock A. M. This being the third day after delivery, I separated the two lobes of the lungs, and placed them in a vessel of pure rain water, exposed to the rays of an intense sun: both lobes being at the bottom of the water. 2 P. M. Both lobes floating. Here and there an air-bubble visible on their surface. Odour very offensive. 7. P. M. Left lobe sunk: right still floating. August 21, 9 A.M. Both lobes sunk, 2 P.M. Both floating, 7 P.M. Both floating. August 22. Both floating all day. August 23, 9 A.M. Both floating; covered with bubbles of air. On taking out one of the lobes, with a view of cutting off a portion of it, I found it so far dissolved as to render it impracticable. On returning it into the water, it immediately sunk. 2 P.M. The lung which sunk this morning again floating. Both now float, and are horridly offensive. August 24, 9 A.M. The lung which was taken out and cut yesterday, sunk again: the other still floating. August 30. No change has taken place in the situation of the lungs since the 24th. Finding the water nearly evaporated, I filled the vessel very cautiously with fresh rain water, upon which the floating lung instantly sunk. August 31. Both lungs still sunk, and never afterwards showed any disposition to float, although suffered to stand for better than five weeks.

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* Mayer in Schlegel, vol. 1, p. 262, 3, 4.

If it should be objected to these experiments, that they are not satisfactory, because the lungs were separated from the rest of the body, it will obviate every difficulty to state a case in which the same result was observed in lungs which had not been taken out of the chest, until after they had become putrid. A case of this kind is related in which the child was certainly born dead. It had already become putrid when it was dissected—its vessels were full of air—and vesicles distended with it were seen on the surface of the lungs. On putting the lungs in water, they floated.*

From the foregoing experiments it thus appears, that in the *incipient* stage of putrefaction, lungs that have never respired will float in water; whereas they will sink if it has continued long enough to completely destroy their organization, and thus extricate all the air contained in them. These results have been corroborated by numerous other observations and experiments, and their truth cannot be doubted. It seems singular, indeed, that they should ever have been questioned, when a case perfectly analogous is witnessed in every person that is drowned. The body at first sinks; afterwards rises to the surface, when putrefaction has generated air sufficient to render it specifically lighter than water; and finally descends again, upon the extrication of that air.

Such being the effect of putrefaction, it becomes a question of great importance to determine in what way we may discriminate between the floating of the lungs as caused by natural respiration, and that which is the result of decomposition.

Independently of the changes produced in the colour and general appearance of the lungs by putrefaction, there are other very characteristic marks by which they may be distinguished.

1. By the appearance of air-bubbles on the surface of the lungs.

On this subject, Dr. William Hunter lays down the following rule: "If the air which is in the lungs be that of respiration, the air-bubbles will hardly be visible to the naked eye; but if the air-bubbles be large, or if they run in lines along the fissures between the component *lobuli* of the lungs, the air is certainly emphysematous, and not air which had been taken in by breathing."[*] Jaeger had before this made a similar observation. In lungs floating from putrefaction, he describes the air as contained in the form of bubbles under the external membrane of those organs, where the air introduced by respiration never finds its way.[†] This rule appears to be founded in truth, and accordingly has been adopted by the best writers on forensic medicine.

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* Edinburgh Med. Essays, vol. 6, p. 450.

2. By the ease with which the air can be extricated from lungs which float in consequence of putrefaction. The evidence of this is to be found in the fact, that if lungs of this description, or any portions of them, be squeezed in the hand, they will immediately sink in water. On the contrary, no compression, however strong, can force out so completely the air from lungs that have respired, as to cause them to sink. This test is insisted upon by Marc, a very distinguished writer on this subject, as the most certain means of discriminating between the effects of putrefaction and respiration.[‡]

3. By cutting out a portion of the internal part of the lungs, and putting this in water, to ascertain whether it will float. If the lungs floated as the result of putrefaction, this internal portion will sink, inasmuch as the air generated by decomposition is confined to the surface of the lungs. If, on the contrary, the lungs have respired, the internal part will float more readily even than that towards the surface.

4. By an examination of the other viscera of the body. Numerous observations have established the fact, that with the exception of the bones, the lungs resist putrefaction longer than any other part of the body. Faissole and Champeau, in experiments which they made upon drowned animals, observed that the lungs remained sound after the whole of the body had become putrefied.[§] Mahon noticed the same fact in his dissections of dead bodies.[||] Camper ascertained, by direct experiments, that the head became so far decomposed by putrefaction, that the slightest force was sufficient to detach the bones of it from each other, as well as those of the arms and legs, before the lungs began to participate in the putrefaction.[¶] I myself observed the same phenomenon in three instances. This was especially the case in a child found floating in the river. The body had become quite putrid—the scalp was distended with air, and so were the bowels. The lungs, on the contrary, were perfectly natural in their appearance, and untouched by putrefaction. From these facts the conclusion evidently follows, that if the rest of the body of the child which is the subject of examination be unaffected by putrefaction, it may, very confidently, be inferred, that the floating of the lungs is not owing to putrefaction.

By a careful application of the foregoing tests, little or no difficulty can arise in deciding whether the lungs float from putrefaction or from respiration.

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[*] On the uncertainty of the signs of murder, in the case of bastard children. By William Hunter, M.D. F.R.S. Medical Observations and Inquiries of London, vol. 6, p. 284.

[†] Schlegel, vol. 5, p. 111.

[‡] Dictionnaire des Sciences Medicales, vol. 10, Art. DOCIMASIE PULMONAIRE.

[§] Mahon, vol. 2, p. 400.

[||] Ibid, vol. 2, p. 400.

[¶] Dissertation on Infanticide, by W. Hutchinson, M.D. p. 47.

But suppose the lungs are found to be actually in a state of putrefaction, is the physician then justified in drawing any conclusions, or in giving any opinion? Mahon advises, in such cases, that it is better for the medical witness to be silent, and to leave to the magistrates the task of finding out other grounds of accusation.* Marc, however, answers this question in the affirmative, and proposes two characteristics, to enable him to offer a positive decision. The first is, that lungs which have respired, notwithstanding they may have been attacked by putrefaction, always have a crepitus when cut into; whereas those which have never respired, although they float in water, are destitute of this peculiarity. The second, and which he considers the most decisive and certain, is this: that upon squeezing out from sections of the lungs the matter developed by putrefaction, they will *sink* if they are from a child born dead; but, on the contrary, if they are from a child born alive, they will, notwithstanding this, continue to *float*.†

II. It is objected that a child may have been born dead, and yet its lungs may float in water, in consequence of their having been artificially inflated, and therefore it is argued, that the mere floating of the lungs is no proof of previous life.

It has been doubted by some, whether artificial inflation of the lungs could ever be effected. Heister states, that he proved by actual experiments, that air cannot be blown into the lungs so as to cause them to float.‡ Hebenstreit also doubts whether it can be accomplished, in consequence of the mucus which is usually found to fill the fauces of a new-born child.§ Roederer, from the failure of his experiments on this subject, was led to the conclusion, that it can only be effected after the child has previously breathed. "A spiritu ori," says he, "inflato pulmones infantis non inflari dilatarique; nisi fœtus aliunde respiraverit."‖ Brendel is still more positive on this point. He believes artificial inflation to be utterly impossible, and assigns two reasons for his scepticism. The first is, the resistance which is made by the thorax and diaphragm, and the second is, the difficulty of introducing a pipe into the glottis, without which he thinks it is impossible to inflate the lungs. He adds, moreover, in confirmation of his opinion, that he made experiments upon pups that were killed while yet in the uterus, and although he attempted to force in the air by a bellows, yet no change was effected upon the lungs, and they sunk when put into water.¶

A contrary doctrine is however maintained by a very large majority of the most respectable authorities in forensic medicine. Low admits the possibility of it, and tells us that Bohn, together with the medical faculty of Leipsic, concurred in the same opinion.** Ludwig says, it is certain that air may be artificially blown into lungs which have never respired, and that they will afterwards float in water.†† In several experiments made to test this matter by the celebrated Camper, the result was uniformly in favour of this opinion.[*] Jaeger, Buttner, and Schmitt, concur in the same, as do most of the French and English writers.

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* Med. Legal, vol. 2, p. 400.

† Manuel d'Autopsie Cadaverique, p. 134.

‡ Morgagni's Works, vol. 1, p. 586.

§ Hebenstreit, p. 405.

‖ Schlegel, vol. 5, p. 112.

¶ Brendelius, p. 166.

** Low, cap. 19, p. [illegible]

†† Ludwig, p. 97.

From the foregoing detail of authorities, it is quite evident, that although artificial inflation of the lungs of a child born dead, is a thing perfectly practicable, yet it is not accomplished with as much facility as many have imagined. This consideration I conceive to be important, because it tends to weaken very much the force of this objection to the hydrostatic test. Still, however, the objection holds good, and there are not wanting occasions when artificial inflation might be attempted. It is not incredible that it might be the result of malice designed to injure the innocent mother; or of maternal tenderness endeavouring to resuscitate a lifeless child. It becomes, then, a matter of great moment, to determine whether the existence of air in the lungs be the product of nature or of art; and it is fortunate for the cause of justice, as well as humanity, that this can be done.

The first test which I shall notice for this purpose, was originally proposed, I believe, by Buttner, and is founded upon the difference of the fœtal and adult circulation of the blood. In the former, it is well known that the blood does not pass through the lungs; whereas, as soon as respiration commences, the old passages are closed, and the whole mass is forced through those organs. If, therefore, a child has been born dead, the arteries and veins of the lungs are found destitute of blood, and in a collapsed state, notwithstanding any artificial inflation that may have been practised upon them. On the contrary, the vascular distention of the pulmonary organs, proves that the child has breathed; for nothing but natural respiration can produce this effect.

A second method of determining this question is, by taking the weight of the lungs, and comparing it with the weight of the whole body, according to the celebrated test of M. Ploucquet. As this is a test of great value, it will be necessary briefly to explain the principle upon which it is founded.

From the peculiarity of the vascular system in the fœtus, only a very small portion of the blood goes the round of the pulmonary circulation. As soon as respiration commences, a change is effected, and the whole mass of the blood passes through the lungs, in order to undergo the necessary process of oxygenation. From this it appears obvious, that the fœtal lungs must be considerably inferior in weight to the same organs after respiration has been established. It is upon this fact that M. Ploucquet founded his test for determining, whether a child had been born dead or alive, by comparing the weight of the lungs with the weight of the whole body. From the experiments which he made to ascertain their proportional gravity, he drew the general conclusion, that the weight of the lungs before respiration is one-seventieth of the weight of the whole body; whilst, after respiration has commenced, it amounts to one thirty-fifth; or, in other words, that the blood introduced into the lungs in consequence of respiration *doubles* their absolute weight. I shall hereafter consider this test more at length.

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[*] Schlegel, vol. 5, p. 112.

A third test has very lately been proposed by M. Beclard. He asserts, that the lungs of a child which has not respired, but which float in consequence of artificial inflation, may be deprived of all the air introduced into them—preserve their original density—and sink in water. On the contrary, in a child which has *respired*, it is impossible by any pressure to force out the air so completely from the lungs, as to cause them to sink. This experiment is said to have been successfully repeated by M. Beclard, in the presence of witnesses.* As yet, I have not been able to subject to proof the foregoing test. I am, however, inclined to believe, that if carefully performed, it may be relied on.

A fourth test has been suggested by M. Marc. He considers that art can never completely inflate the lungs; and, from the greater difficulty which attends the admission of air into the *left* lung, he is induced to believe, that the inferior extremity of that lung will remain in a collapsed state, and float but imperfectly or not at all.† This test is certainly ingenious, but, I think, quite inconclusive, inasmuch as the same appearances may be observed after natural respiration has taken place; and, if so, it can furnish no ground of distinction between respiration and artificial inflation of the lungs. It is a curious fact, connected with the history of incipient respiration, that the *right* lung receives air much sooner than the left. M. Portal first discovered this, and afterwards confirmed it by numerous experiments. In a kitten, which he killed a few minutes after it was born, the right lung was of a whitish colour, filled the whole cavity of the chest, and swam in water. The left was of a dark red colour, in a collapsed state, and sunk in water. He accounts for this interesting phenomenon, by showing that there is a difference in the size and direction of the bronchiæ leading to the two lobes. Upon examination, he found the right one about one-fourth part thicker, and one-fifth shorter, than the left; besides, he found the passage to the right to be more direct than that to the left.‡

III. It has been objected, that "a child will very commonly breathe as soon as its mouth is born, or protruded from its mother; and, in that case, may lose its life before it is born, especially when there happens to be a considerable interval of time between what we may call the birth of the child's head, and the protrusion of the body."§

This objection did not originate with Dr. Hunter. It is noticed by Morgagni; and I find it discussed by the German writers early in the last century. It must be admitted, however, that the high authority of Hunter's name has given to it an importance which it otherwise would never have possessed, and it is on this account more especially deserving of examination. It involves two points, each of which is worthy of distinct elucidation. Is it possible that a child can breathe when nothing more than its head is delivered? and, if so, is it probable that after having respired in this situation, it will die before the delivery of the rest of the body?

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* London Med. Repository, vol. 9, p. 161.

† Manuel d'Autopsie Cadaverique, &c. p. 138.

‡ Duncan's Medical Commentaries, vol. 1, p. 245. Am. ed.

When putrefaction does exist, it is surely no difficult matter to ascertain it, by the smell and colour. On a late northern Scotch circuit, a medical man gave it as his opinion, that the hydrostatic test was useless, because, *by tying a ligature round the trachea you forced air into the lungs ! ! !* When our friends on the other side of the Atlantic hear the opinion of this Aberdeen heretic, they must suppose that in forensic medicine we are *progressing* the wrong way.—EDITOR.

§ Dr. W. Hunter, in the Med. Obs. and Inq. of London, vol. 6, p. 287.

Although it is denied by some very respectable authors, that a child can perform the act of respiration when merely its head is born, yet the fact rests upon evidence too substantial to be contradicted. Independently of the authority of Dr. Hunter, we have several other writers who furnish us with decisive testimony on this subject. Marc alludes to a case of this kind reported by M. Siebold.* Capuron, a respectable French writer on legal medicine;† relates a similar instance which occurred in his own practice. And Osiander informs us, that he has witnessed twelve cases, in which the child breathed and cried as soon as the head was born.‡ It must, therefore, be conceded, that a child may breathe and cry as soon as its head is delivered, although it is equally true, that it is by no means a common occurrence. Admitting, then, that a child may actually breathe in the situation we have supposed, is it probable that it will lose its life before the complete expulsion of the body? That it is not, appears to me of very easy demonstration; and, if so, the objection loses at once almost all its force. Even among the writers who are most strenuous in support of this objection, I have not met with a single one who pretends to have witnessed an instance in which a child has actually died in this situation. Low, although he thinks it possible, relates no case of it. Dr. Hunter, whose professed object was to enforce all the probable exceptions to the hydrostatic test, gives us nothing more than his opinion, unsupported by facts. Mahon barely admits the possibility of it. Capuron, who is sufficiently sceptical on this subject, contents himself with recording the case already alluded to, in which the child was safely delivered. Even Osiander, with all his marvellous cases, does not present us with a single one of this kind. In point of fact, therefore, there is no instance recorded, so far as my knowledge extends, in which a child has actually expired under these circumstances. This, however, does not prove that it might not occur; and it is therefore necessary to inquire into all the possible causes which might produce its death. If a child expires after the delivery of the head, and before the expulsion of the rest of the body, its death will probably be owing to one or other of the following causes: 1. Natural debility of the child. 2. Pressure on the umbilical cord, interrupting the fœtal circulation. 3. Cessation of labour pains. 4. Unusual shortness of the umbilical cord. 5. A preternatural enlargement of the *body* of the child. 6. A tumour upon some part of the body of the child, mechanically interrupting parturition. I shall very briefly examine each of these in their order.

That *natural debility* on the part of the child cannot occasion it, seems to be proved by the very fact of respiration having taken place; for the exercise of that function so prematurely, necessarily implies a degree of vigour inconsistent with the supposition of such original feebleness.

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* Manuel d'Autopsie Cadaverique, p. 140.

† Capuron, p. 405.

‡ New-York Med. and Phys. Journal, vol. 1, p. 372.

That *pressure on the cord* should produce the death of the child, appears equally improbable. It is perfectly plain, that when this cause proves detrimental, it must be anterior to respiration, and when as yet the life of the child depends wholly upon the fœtal circulation. In the present instance, however, the child is supposed to have already breathed, and therefore any accidental interruption in the fœtal circulation cannot, in all probability, be attended with any injurious consequences.

Cessation of the labour pains. If, after the delivery of the head, there be a sudden cessation of the pains, there is no doubt that the child may be retained in this awkward situation for some time, and that it may even lose its life before it is completely expelled. Still it must be obvious, that the chance of such an issue is very much diminished in all those cases where respiration has actually commenced, inasmuch as the performance of this function proves not merely that the child is vigorous, but also that its thorax and body are not so closely compressed by the parts of the mother as to endanger its life. Hence a child, under these circumstances, may be detained a considerable length of time, without jeopardizing its existence.

Unusual shortness of the cord. Cases of this kind occasionally occur. But here too the very fact of respiration having commenced, gives the child the best possible chance of being eventually born alive.

Preternatural enlargement of the body of the child, more especially of the shoulders, may prevent the delivery of the child, even after the birth of the head. That a child might die from this cause, is not disputed; but the very fact of its shoulders and chest being so large as to prevent delivery, shows how difficult, if not impossible, it would be for it to respire. If, however, it did actually respire, then the hazard of a long detention in this situation would, by this very circumstance, be materially diminished. In addition to all this, the cause would here be so very obvious, on a bare inspection of the child, that no serious error could possibly arise from this source.*

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* Since penning the above, I have received the following note from Dr. Hosack, communicating the particulars of a highly interesting case.

"New-York, June 28, 1822.

"Dear Sir—You have been correctly informed of the fact you refer to, of the death of an infant taking place between the birth of the head and the extrication of the shoulders. Such a case occurred in my practice in this city, in the year 1811.

Mrs. R——, a lady of a small delicate frame of body, and the mother of several children, engaged me to attend her in her lying-in. The commencement of her labour proceeded with the usual symptoms that she had experienced upon former occasions, excepting that she suffered more severely from her pains, doubtless attributable to the child being larger than those she had borne in her preceding labours.

Being absent from home when sent for, another physician was called upon. We both arrived nearly at the same time. The child's head was born. It had been in that situation, without making any advance, for some minutes. The child had cried, and was yet living when I arrived. The pains were very active, but one of the shoulders was so firmly wedged above the pubes, that with all our exertions we could not release the child in time to preserve it alive. It was still-born; and I need scarcely add, that upon examining the child, besides its extraordinary size, an unusual breadth of shoulders was found to exist, to which circumstance doubtless its detention in the passage through the pelvis was to be ascribed.

This fact, the only one of this nature which I have met with either in practice or

A tumour on the body of the child. This, of course, must be a very rare occurrence, and can never lead to any false decisions. I mention it merely because a case of this kind is recorded, in which "the head of the child was protruded, and the expulsion of the body, for a considerable time, prevented, in consequence of a large excrescence on the left breast of the child. During this interval, which was about half-an-hour, the child frequently cried so loud as to be heard by the attendants."* It does not, however, appear even in this case, that the child eventually lost its life; at least nothing is stated to this effect in the account which is given of it. So far from supporting the objection of Dr. Hunter, which we are considering, it proves, in the most pointed and satisfactory manner, how little danger attends the child in this situation, when it enjoys the benefit of respiration. Besides, it should be recollected, that in all cases where delivery is prevented in consequence of the unnatural size of the parts about the shoulders, &c. the assistance of a physician, or at least of a second person, becomes necessary. A witness, therefore, will always be at hand, to remove every ambiguity which may surround them.

From the foregoing discussion, it may, therefore, fairly be concluded, that in reality very little danger attends the child under the circumstances which we have supposed.

I shall sustain this argument by the opinions of one or two writers, distinguished for their extensive experience, as well as practical sagacity. In a case of this kind, Burns directs that we should "attend to the head, examining that the membranes do not cover the mouth, but that the child be enabled to breathe, should the circulation in the cord be obstructed. *There is no danger in delay,* and rashly pulling away the child is apt to produce flooding, and other dangerous accidents." In another place, he says, "some children die, owing to the head being born covered with the membranes, some time before the body. This is the consequence of inattention; for, if the membranes be removed from the face, there is *no risk of the child.*"† Denman also remarks, that "it was formerly supposed necessary for the practitioner to extract the body of the child immediately after the expulsion of the head, lest it should be destroyed by confinement in this untoward position. But experience has not only proved that the child is not, on that account, in *any particular danger, but that it is really safer and better both for the mother and child,* to wait for the return of pains, by which it will soon

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in the records of midwifery, presents a new case for the consideration of writers on legal medicine. As such I communicate it.

I am, very truly, yours,

John B. Beck, M.D." D. Hosack.

In addition to the particulars stated by Dr. Hosack, he informed me, that judging from the size of the shoulders, he believes it would have been impossible for the child to have been extricated from its situation, without the aid of manual assistance. In a case of this kind, therefore, no difficulty could ever arise in coming to a prompt and correct decision.

* Mahon's Essay on Infanticide, translated by Christopher Johnson, of Lancaster. —See note by Mr. Johnson, p. 25.

† Principles of Midwifery, p. 246, 376.

be expelled; and a more favourable exclusion of the placenta will also by this means be obtained."*

On a review of the whole of this part of our subject, it results, that a child may occasionally breathe as soon as its head is delivered—that the very fact of its breathing in this situation, gives it the best possible chance of being born alive—and, finally, if it should even die, the cause of its death will generally be at once evident upon a mere examination of the body of the infant.

From the preceding examination of objections† to the *Hydrostatic test*, I think we may safely come to the following conclusions:

1. That when the lungs float in water, it must be from one of three causes: natural respiration—putrefaction—the artificial introduction of air.

2. As the lungs may float from other causes beside respiration, their mere floating is no proof that the child was born alive.

3. As, however, it is possible to discriminate between the floating of natural respiration, and of that which is the result of other causes, it follows,

4. That, with due precautions, the floating of the lungs may be depended upon as a safe and certain test, that the child has been born alive.

I shall now proceed to examine another class of objections to the hydrostatic test, which have been much insisted upon, and which have tended, perhaps, no less than those which have already been considered, to shake the faith of the public with regard to its accuracy.

I. It has been objected that the child may have breathed, and yet the lungs, in consequence of diseases of various kinds, may have their specific gravity so increased as to cause them to sink in water. And, therefore, it is argued that the sinking of the lungs is no proof that the child was not born alive.

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* Introduction to the Practice of Midwifery, p. 289.

† Another objection has been made against the hydrostatic test, which has not been considered in the text, because I have not been able to convince myself that the facts upon which it rests ought to be accredited. I refer to the *crying of the child in the womb*. Cases of this kind are *said* to have occurred, and have been gravely published to the world. In the 26th volume of the Transactions of the Royal Society of London, Mr. Derham gives an account of a child which cried almost daily for five weeks before delivery! Another case is detailed in the 73d No. of the Edinburgh Med. and Surg. Journal, by Dr. Zitterland, of Strasburgh, in Prussia. In this instance, the child is said to have been rather more civil than in the case of Mr. Derham, and began to cry only forty-eight hours before it was born! The most respectable writers on medical jurisprudence, however, deny the *possibility* of the occurrence, and ridicule the instances of it which are upon record. Mahon justly asks, whether "the best possible authority is sufficient to establish so extraordinary a fact? Few writers," he adds, "venture to say with Bohn, that they themselves have heard it. Three-fourths quote hearsay, and adduce witnesses. The love of the marvellous often distorts facts—it invents them, and finds authority and proselytes. On the report of a fact attested by credible witnesses, we may give our assent to whatever is not contradictory in itself; but *conviction* is a much greater degree of assent, and requires other proof. Bohn may have been deceived by the parson's wife; he may have heard some gurgling noise, and may have been led away by a want of facts to prove his opinion. This mode of reasoning, and scarcity of facts, has given credit to Livy's history of a child, which cried "*Io triumphe*," in the belly of its mother. The folly has been carried so far, that we read of children that have laughed and cried in the uterus."—Johnson's translation of Mahon on Infanticide, p. 18, 19.

This objection has been deduced principally from analogy. It has been observed, that various morbid affections of the pulmonary organs of adults, as peripneumony, hydrothorax, calculi, schirri, ulcers, &c., will cause their subsidence in water, and hence it has been inferred, that the same might take place in the fœtus.

That the lungs of adults may undergo such changes from disease, as to cause them to sink in water, I am not disposed to deny, although I think it occurs less frequently than is generally believed. Haller informs us, that he has seen lungs of this description, which nevertheless continued to float. "Vidi sanguinem ex ruptis per funestam peripneumoniam vasis in pulmonem effusum, ut tamen nataret; vidi schirrhos, calculos, et lymphaticum coagulum, ut minime tamen subsideret."* He admits, however, having seen a case of peripneumony, in which the lungs sunk in water; and he adduces several other cases of a similar nature, upon the authority of others.† Heister records the case of a young man who died of phthisis, whose lungs were specifically heavier than water.‡ De Haen relates, that he met with three or four cases, in which portions of the lungs of adults sunk in water, and, he adds, that Diemerbroeck witnessed the same in a patient whose lungs were in a schirrous condition.§ Hoffman details the case of a young man who died of pneumonic fever, in whose lungs the same was observed.|| In speaking of the dissections of those who died of pleurisy, in the Island of Minorca, Cleghorn says, that "in many the lungs were converted into a hard liver-like substance, and *sunk in water*."¶ Dr. Baillie confirms the same general fact. "In consequence," says he, "of the greater quantity of blood being accumulated in the inflamed portion of the lungs, they become considerably heavier, and will *frequently sink in water*."** Finally, there is recorded, in a late Journal, a case of "condensed lungs," occurring in a subject twenty-four years of age, and which immediately sunk on being immersed in water.†† These facts are sufficient to illustrate the grounds upon which the objection rests. And they prove incontestibly, that the lungs may occasionally be rendered, by disease, specifically heavier than water. It cannot be admitted, however, that these morbid conditions will frequently occur in the fœtus, for it is not exposed to the influence of the causes which usually produce them. Haller, notwithstanding his great experience and extensive learning, relates no instance of it, and expressly asserts, that they are very rarely found in the fœtal state. "In adulto homine *aliquando*, in fetu *rarissime*, ut pulmo calculis, schirris, aliave materie, morbose gravis in aqua subsideat, etsiquam respiraverit."‡‡ Brendel, in speaking on this subject, relates only a single case of an abortive fœtus which had schirrous lungs, and considers it a singular occurrence.§§ I shall only add, in confirmation on this point, the opinion of Dr. Duncan, Jun. the accomplished editor of the Edinburgh Medical and Surgical Journal. "Unquestionably a piece of inflamed lung will sink in water like a piece of liver, *but we doubt that such inflammation was ever observed in the lungs of a new-born infant,* concerning which a question of its having been still-born could arise; and we deny the fact, that any portion of lungs which have breathed, will ever be rendered specifically heavier than water, by the mere settling of the blood in the lower portions after death."*

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* Elem. Phys. vol. 8, p. 281. † Ibid. ‡ Hebenstreit, p. 401.

§ Ratio Medendi, vol. 1, p. 114. || Opera Omnia, vol. 2, p. 140.

¶ Observations on the Epidemical Diseases of Minorca. By Geo. Cleghorn. P. 159. Am. ed.

** Morbid Anatomy, p. 33. Am. ed.

†† Edinburgh Med. and Surg. Journal, vol. 4, p. 301.

‡‡ Element. Physiol. vol. 8, p. 281.

§§ Brendelius, p. 10.

It appears then, as well from reason as from facts, that the objection is founded upon the existence of circumstances barely possible, and by no means probable; as such, however, it demands consideration, and it is necessary to suggest the means by which a false judgment may be prevented.

For this purpose we have a test both simple and certain. The objection takes it for granted that the child has breathed; whether feebly or vigorously is a matter of no consequence. Some part, therefore, of the lungs *must* contain air, and although the quantity of it may be too small to cause the whole lungs to float, yet if they be divided into a number of pieces, and any of them remain on the surface, there cannot be a moment's hesitation about the conclusion to be drawn. Foderè states, that he frequently made experiments upon lungs that were schirrous, or had congestions of blood, and he uniformly found, that although they sunk when put into water entire, yet, when cut into pieces, some of them always floated.†

II. It has been objected, that a child may have actually breathed, but yet so feebly and imperfectly, that the lungs shall not have received air sufficient to enable them to float: and hence it is argued, that the sinking of the lungs is no proof that the child was born alive.

In support of this objection, facts of a very pointed nature have been adduced. Heister relates the case of a very feeble infant, whose lungs sunk in water, though it lived nine hours after birth.‡ And a late writer on Infanticide states, that he had been informed by a physician to the Foundling hospital at Naples, who opened daily, on an average, the bodies of ten or twelve infants, which had generally died within twenty-four hours after birth. that he hardly ever found more than a very small portion of the lungs dilated by air: this portion was frequently not larger than a walnut in its green shell, and but rarely larger than a hen's egg, and it was commonly situate in the right lung. §

The same method must be here adopted, as in cases where the lungs are diseased: they must be cut into several parts, and experiments instituted upon each. However imperfect the respiration has been, some portion of the lungs will necessarily be inflated, and therefore must float.

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* Edinburgh Med. and Surg. Journal, vol. 12, p. 79, 80.

† Foderè, vol. 4, p. 487.

‡ Morgagni's Works, vol. 1, let. 19, p. 536.

§ A Dissertation on Infanticide, in its relations to Physiology and Jurisprudence. By W. Hutchinson, M.D. 1820.

III. It has been objected, that a child may be born alive without breathing; and, therefore, in these cases, the sinking of the lungs is no proof that the child was not born alive.

The fact upon which this objection is raised, cannot be questioned; nevertheless, it is both safe and just to consider as dead every child that has not breathed. Governed by such a rule, any error that may be committed will always be on the side of mercy. It is true, that certainty is as desirable here as in any other case, for the destruction of a feeble child is a crime as enormous as that of a vigorous and healthy one, and the punishment of the murderer of the one is equally an object of public concern with that of the other. But in the language of a distinguished writer on this subject, "pour le punir, il faut le constater; et lorsque les limites de l'art nous refusent le degré de certitude que nous ambitionnons, la clémence, que dis-je, la crainte d'immoler l'innocence devra l'emporter sur toute autre consideration."*

This objection, so far from showing the inconclusiveness of this test, serves only to establish more clearly its absolute necessity. It is by resorting to it alone, that the sacrifice of innocence can be prevented, for who would assume the responsibility of deciding that a child had been born alive, when no evidence could be discovered of its having respired?

From the foregoing considerations, it may therefore be concluded—

1. That when the lungs sink in water, it must be from one or other of the following causes: the total want of respiration—feeble and imperfect respiration—some disease of the lungs rendering them specifically heavier than water.

2. As the lungs may sink from other causes than the absence of respiration, their *mere sinking* is no decisive proof of the child's having been born dead.

3. As, however, the sinking from the want of respiration may easily be distinguished from that which is the result of other causes, it follows,

4. That, with due precautions, the sinking of the lungs is a safe test that the child was not born alive.

I have now gone through the discussion of this subject; and although the general conclusion is decidedly in favour of the accuracy of the hydrostatic test, yet nothing can be plainer than the necessity of an extensive acquaintance with the subject, to enable the professional witness to do justice to himself and to the cause of truth. It is much to be feared, that from the ignorance of some, and the precipitancy of others, great and fatal errors have not unfrequently been committed. It may not, therefore, be improper to present a summary of *practical rules*, for the guidance of the physician when called to the examination of a case, which, of all others, demands a combination of the exercise of the soundest judgment, and the most profound knowledge.

1. As preliminary to any examinatiom of the lungs, the child should

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* Manuel d'Autopsie Cadaverique, par C. C. H. Marc, p. 140.

be weighed, and the general appearance and condition of the body should be particularly noted, with the view of ascertaining the following points, viz. if the child be full grown—if the different parts of its body be well-proportioned—if the shoulders be uncommonly large, when compared with the size of the head—if any tumours are to be found upon the body—if the cord be unusually short—and, finally, if any symptoms of putrefaction be present.

2. The chest should then be carefully opened, and the following things noticed; the general shape of the thorax, whether it be much arched or otherwise—if the lungs be collapsed or dilated—whether they cover the lateral parts of the pericardium and heart—whether their colour be deep red or lighter—whether there be any appearance of disease or of putrefaction.

3. The next step is to remove the contents of the chest, for the purpose of performing the necessary experiments upon the lungs. The aorta and vena cava should first be tied near the heart, and then cut beyond the ligatures; the trachea should then be also divided. The lungs, together with the heart, are now to be taken out of the chest, and to be submitted to an additional inspection, to ascertain whether they are sound or diseased, and if they are at all affected by putrefaction.

4. A convenient vessel containing water should now be provided, and particular attention should be paid to the temperature of the water, in which the lungs are to be immersed. The reason of this will be perfectly obvious, when it is recollected, that the specific gravity of water varies with its temperature; thus, for instance, water at 100 deg. is lighter than water at 60 deg. and still lighter than at 40 deg. Besides, if the water be too hot, it will have the effect of expanding the lungs, and thus favour their floating, especially when there already exists a tendency to putrefaction. If, on the contrary, its temperature be too low, the air-cells may be contracted, and much of the air be thus expelled. The temperature of the water should therefore be regulated by that of the surrounding air. Another precaution relative to the water is, that it should not be impregnated with *salt*, for, in consequence of the greater specific gravity of saline water, a body might float in it, which would sink in fresh water.

5. The lungs, together with the heart, should then be cautiously placed in water, and it should be observed whether they float or sink; if they float, whether above the surface of the water, or just under it; if they sink, whether they do so rapidly or gradually.

6. The lungs should then be taken out of the water, and after tying the pulmonary vessels, they should be separated from the heart, and accurately weighed.

7. The lungs should then be replaced in the water, to see whether they sink or float, and in what way.

8. The two lobes should then be separated, and the same experiment repeated upon each, noticing the difference, if any, between them. If one only floats, see if it be the *right* one.

9. Each lobe should then be divided into a number of pieces, taking care not to confound the fragments of one lobe with those of the other, and upon each of these the same experiments should be instituted.

10. While cutting the lungs, observe if there be any crepitus; if the vessels are charged with blood; and if there be any traces of disease.

11. If any of the sections of the lungs float, they should be taken and squeezed forcibly in the hand, and then replaced in the water, to determine whether after this they will sink.

Having gone through these different processes, the conclusions to be drawn from them are evident. If there is nothing to be discovered on the body of the child, to favor the belief that it might have lost its life during delivery—if the lungs be not touched by putrefaction, nor be artificially inflated—if, on cutting into them, a crepitus be perceptible—if the entire lungs, as well as the separate divisions of them, remain on the surface of the water—if, after squeezing portions of the lungs, they still continue to float—then the mass of evidence is irresistible that the infant was born alive, and enjoyed perfect respiration. If only the *right* lung, or its pieces, float, the respiration has been less perfect. If some pieces only float, while the greater number sink, it proves respiration to have been still less complete. On the other hand, if neither the entire lungs, nor any section of them, float in water, the inference is decisive that the child never respired.

Having noticed at sufficient length the various circumstances relating to the hydrostatic test, I shall next consider,

(b) Ploucquet's test. This test was first announced by its author, M. Ploucquet, in 1782; and I have already had occasion to explain the principle upon which it is founded.*

Beautiful and decisive as this test appears to be, and correct as the general principle upon which it is founded certainly is, objections of a very serious character have been brought against it. For the purpose of showing to what confidence it is entitled, it may be proper to notice some of the more important objections.

Examination of objections. 1. There is no fixed proportion between the weight of the lungs and the weight of the body.

An appeal to facts and experiments must of course determine the value of this objection. It seems to be conceded on all hands, that M. Ploucquet deduced his theory from a very limited number of experiments. In one child born dead, he found the comparative weight of the lungs to the body to be as 1 to 67; in another, as 1 to 70; in a third, which had been born alive, it was found to be as 2 to 70, or as 1 to 35. These were all the experiments which he had made when he promulgated the general conclusion which he drew from them. As might naturally be expected, from the novelty and importance of the subject, it has since then attracted the attention of the ablest medical jurists, and their researches have tended very materially to diminish the confidence originally placed in this test. The most extensive experiments yet made on this subject, were those conducted by M. Chaussier at Paris, and M. Schmitt at Vienna. The following are the results of some of their observations:

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* See page 161 of this work.

Experiments on the bodies of infants who had respired.						*Experiments on the bodies of infants who had not respired.*					
M. Schmitt.			M. Chaussier.			M. Schmitt.			M. Chaussier.		
Weight of the body.	Weight of the lungs.	Proportion between the wt. of the lungs & the body.	Weight of the body.	Weight of the lungs.	Proportion between the wt. of the lungs & the body.	Weight of the body.	Weight of the lungs.	Proportion between the wt. of the lungs & the body.	Weight of the body.	Weight of the lungs.	Proportion between the wt. of the lungs & the body.
Gram.	Gram	Gram.	Gram.	Gram	Gram.	Gram.	Gram	Gram.	Gram	Gram	Gram.
1012	35	1 to 29	1025	38	1 to 28	659	18	1 to 35	650	6	1 to 108
1065	31	34	1040	32	34	873	22	39	900	19	47
1091	66	16	1100	25	44	1065	70	16	1031	21	50
1099	35	31	1168	17	43	1361	36	37	1400	60	23
1222	31	39	1224	46	36	1572	39	40	1591	38	42
1257	18	70	1250	41	31	1577	35	47	1625	66	25
1466	28	52	1469	25	59	1915	41	44	1900	52	37
1518	31	48	1520	30	50	2090	35	59	2080	48	43
1863	43	43	1850	43	43	2177	32	67	2200	37	60
1968	22	87	1958	81	63	2221	28	79	2250	87	26
2002	54	37	2000	72	28	2352	54	43	2350	44	54
2160	57	38	2150	60	36	2589	74	34	2570	30	86
2366	46	51	2360	38	62	2648	43	61	2650	47	56
2404	36	66	2400	74	32	2758	35	79	2750	74	37
2491	70	35	2490	97	26	2981	44	67	2950	48	62
2758	87	31	2750	93	28	3102	70	44	3100	57	65
2893	49	59	2900	54	54	3312	61	54	3324	41	81
2998	70	42	3000	113	27	3451	49	70	3350	54	62
3207	61	52	3250	65	50	3502	61	54	3600	50	72
3294	80	41	3300	75	44	3660	57	64	3672	41	90
3731	75	49	3650	105	35	4150	50	83	4161	83	50
4150	105	39	4040	42	96	4185	83	50	4300	100	41

Mean proportion, $42\frac{528}{1130}$ $30\frac{109}{1225}$ || Mean proportion, $52\frac{60}{1035}$ $49\frac{9}{1105}$*

II. Even admitting that there is a fixed proportion between the weight of the lungs and the body, it is very different from that of M. Ploucquet.

This objection is certainly supported by the experiments of Schmitt and Chaussier, already recorded, as also by those of Hartmann. This latter physician makes the proportion to be, in an infant which has not breathed, as 1 to 59; and, in one which has breathed, as 1 to 48..

III. A third objection to this test is, that an excessive congestion of blood might occur in the lungs of a fœtus that had never respired, which should render them equal in weight to the lungs of a fœtus which had respired.†

To this M. Ploucquet himself replies, that it is not possible for such a congestion to take place in lungs that have never respired, as shall render their weight equal to that consequent upon respiration, because the foramen ovale and the canalis arteriosus offer so easy a passage to the current of blood, even when flowing with the greatest rapidity, that no determination of consequence can exist towards the pulmonary vessels.

IV. A fourth objection has been drawn, from the alteration produced by putrefaction, in the relative weight of the lungs and body.

On this, Professor Mahon remarks, "that this may be the case if the putrefaction be very great, but then the fœtus cannot be subjected to any examination upon which a medico-legal decision can be founded. But, if the putrefaction has not advanced far, as the lungs resist its effects longer than any other part, we may try the application of the proposed test, to corroborate the results afforded by the hydrostatic trials."*

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* Dictionaire des Sciences Medicales, Art. DOCIMASIE PULMONAIRE—and a translation of the same in the Western Quarterly Reporter, No. IV.

† Mahon, vol. 2, p. 454.

With the view of satisfying myself with regard to the correctness of the test of M. Ploucquet, I had commenced a series of experiments, which nothing but the want of subjects has prevented me from prosecuting as extensively as I originally contemplated.

Exp. 1. New-York, April 5, 1821. I was requested by the coroner to examine a male child, which had been found dead, exposed in one of our streets. From the size and appearance of the child, and from a variety of concurring observations upon the lungs and other parts of the body, no doubt remained that the child had been born alive, and had performed complete and perfect respiration. In this case, the relative weight of the lungs and body was as 1 to 35$\frac{12}{47}$.

Exp. 2. Feb. 2, 1822. A female child, found exposed in Anthony-street, was examined by Dr. Dyckman and myself, in the presence of the coroner. The child had evidently respired. In this case, the proportion of the lungs to the body was as 1 to 37½.

Exp. 3. June 26, 1821. Examined a child which had been found in a sink—appeared to be of full size. The whole body was in a state of putrefaction; the lungs were also found in a similar condition. After a very careful and minute examination, I satisfied myself that the child had *not* been born alive. The proportion here between the weight of the lungs and the body, was as 1 to 46⅓.

Exp. 4. May 7, 1822. Dr. J. W. Francis requested me to inspect with him a fœtus, the delivery of which he had attended three or four days previously. It had reached about the fifth month, and was judged to have been dead in the uterus about six days before delivery, owing to an accident which had happened to the mother. The fœtus was at present in a state of incipient decomposition; the lungs, however, were prefectly sound. The proportion between the weight of the lungs and the body, was as 1 to 29.

Exp. 5. Oct. 18, 1822. Another case, similar to the preceding, was examined by Dr. Francis and myself. The child was born between the fifth and sixth month, in a state of decomposition. The lungs were perfectly sound. The proportion between the lungs and the body, was as 1 to 39$\frac{4}{7}$.

The two first of the cases just detailed, certainly go to support the correctness of Ploucquet's test. The approximation is unquestionably as near as the nature of the case is capable of. The three last seem to prove that putrefaction does effect a material change in the relative weights of the lungs and body.

Notwithstanding, therefore, all that has been urged against the test of Ploucquet, I cannot conclude, from my own observations, that it should be entirely rejected. Like every other test of this kind, however, it must be used with caution; and in all instances where putrefaction has assailed either the body or the lungs of the child, or both, no dependance is to be placed upon it.

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* Mahon, vol. 2, p. 454.

After all, further observations are still called for, to settle the doubts occasioned by testimony so discordant, and even contradictory as that presented to us on this subject. In no other way can we hope to reach a satisfactory conclusion. And it is to be wished that practitioners of midwifery would not neglect the multiplied opportunities daily presented to them, of enlarging our stock of knowledge on this interesting and important question.

(c) *Daniel's test.* The principle of one of the tests proposed by M. Daniel, is the same as that of the test of Ploucquet. He judges of the reality of respiration having taken place, from the increase of weight which a given quantity of water gains upon squeezing out the lungs into it. He thinks it may be known also from measuring the periphery of the thorax and lungs, and comparing their dimensions with those of an infant which has not respired. With regard to these, it must be granted, that the first is inferior in precision to that of M. Ploucquet; whilst in the second, it is necessary that the observations and measurements should be so exact, that many errors might and would undoubtedly occur.

(d) *The descent of the diaphragm.* It is very evident, that as soon as respiration commences, the cavity of the chest must necessarily be enlarged in every direction, to give play to the action of the dilated lungs. In consequence of this, the chest externally becomes more elevated and arched, and internally the diaphragm descends. To a person accustomed to the examination of subjects, this descent will be obvious; and, taken in connection with the other signs of respiration, is one of considerable importance.

(e) *Diminution in the size of the liver.* It is a fact universally known, that, previous to the birth of the fœtus, the liver is much larger than it is afterwards. From the changes which take place in the circulating system immediately upon the commencement of respiration, the cause of this diminution in the size of the liver becomes very obvious. It has already been stated, that prior to respiration the lungs have scarcely any blood circulating through them—hence they are small and collapsed. As soon, however, as respiration is established, the pulmonary vessels become charged with blood—the lungs are consequently much enlarged, and their actual weight greatly increased. Now there is no question that this blood is chiefly derived from the liver, and to this cause must its lessened size be principally attributed. Besides supplying the lungs with blood, there is another beneficial purpose answered by this diminution of the liver. If the lungs become enlarged and dilated, it is evident that the cavity of the chest must also be proportionably augmented, to enable them to perform their functions without restraint or injury. By the diminution of the liver this is most effectually accomplished, inasmuch as by it the cavity of the abdomen is thus lessened and the descent of the diaphragm facilitated.*

If this be a correct exposition of the reciprocal relations of the fœtal lungs and liver, it appears to me that an examination of the state of the *liver* must throw very considerable light upon the question of a child's having been born alive.

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* For a very able and satisfactory account of the state of the fœtal liver, see the paper of Mr. Bryce, published in the Edinburgh Med. and Surg. Journal for January, 1815.

If the size of the liver in the fœtal state be owing to the large supply of blood which it then receives, and if it uniformly loses a portion of this blood after respiration commences, it strikes me that a comparison of the weight of the liver before and after respiration, with the weight of the whole body, would assist us very materially in deciding whether a child had been born alive or not. The *principle* upon which the proposed test is founded, is certainly just, and in practice it would not be liable to more serious objections than that of M. Ploucquet. On the contrary, it might serve in all cases to prove the accuracy of this latter test. To exemplify—if by the application of the test of Ploucquet in a case of supposed infanticide, it should be found that the lungs had acquired the weight of those of a child that had respired, and if, by a subsequent examination of the liver, it should appear that this organ had lost none of its fœtal blood, then there would be just ground for suspecting that the increased weight of the lungs was owing not to respiration, but to some other cause.

On the other hand, if experiments upon the liver should indicate that respiration has taken place, while the lungs themselves exhibit no sign of it, then the diminished weight of the liver must be attributed to some other cause, and no possible error could arise from this source.

If, however, experiments both upon the liver and the lungs coincide in supporting the same opinion, who will deny that this concurrence of different tests would add greatly to the force and conclusiveness of the testimony.

By no writer on forensic medicine that has fallen under my examination, has this test been suggested; and I throw it out at present, in the hope that it may attract the attention of inquirers on this interesting subject.

It should never be forgotten by those engaged in medico-legal decisions, that any single individual test taken apart from all others, must necessarily be unsatisfactory. In proportion, therefore, as proofs and tests become multiplied, are the chances of deception and erroneous judgments diminished; and more especially is this the case, when these proofs come in full and direct support of each other. They then furnish a mass of clear and consistent evidence, capable of satisfying both the witness and the judge.

(f) The discharge of the meconium. Authors do not agree with regard to the nature of the meconium. The opinion, however, which seems most plausible, considers it to be the bile collected in the fœtal liver, and which is propelled from that organ into the intestinal canal, by the compression which the liver necessarily sustains as soon as respiration commences* The same compression afterwards expels it from the intestinal canal. Upon this principle, the connection between respiration and the discharge of the meconium is perfectly plain. Too much stress should not, however, be laid upon this circumstance. For although Mr. Bryce asserts, that " there is no instance in which infants born at the end of the ninth month have ever suffered this

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* Bryce on the fœtal liver. Edin. Med. and Surg. Journal. Blumenbach's Physiology, p. 359, Am. ed.

evacuation previous to their birth," yet we have the high authority of Dr. Denman to the contrary, who states, that he met with a case in which the meconium was discharged upwards of thirty hours before the child was born.*

(g) *The state of the bladder.* Anterior to birth, it has been ascertained that the bladder contains a considerable quantity of urine. If, therefore, on examination it should be found empty, the presumption is in favor of the child having been born alive, and of having lived sufficiently long to pass its urine by its own efforts. It is obvious, however, that this test is liable to many exceptions, and should not therefore be infallibly relied on. It is not impossible, that, under certain circumstances, a child may void its urine before birth; and, on the other hand, a child born alive, may die before it has performed that function.

Having considered the various proofs by which it may be known whether a child was born alive, we are next to inquire into the means by which it came to its end.

Of the various means by which a child's death may be caused. These are classified by systematic writers, as those of *omission*, and those of *commission*. The former include all those which prove fatal by the neglect of those precautions which are necessary to be attended to immediately after the birth of the child; the latter embrace all direct acts of violence, designed to take away life. The division is certainly a happy one, as it leads to a distinction of some consequence in practice. It keeps constantly in the view of the physician and the jury, the important truth, that most of those belonging to the one, *may* be palliated or explained on the grounds of ignorance, or want of presence of mind; whilst the other are more generally the products of premeditated malice, and therefore cannot lay claim to the same source of justification.

Infanticide by omission. (a) The death of a child newly born may be caused by *omitting* to remove it from that state of supination † in which it sometimes comes into the world. In this way, respiration may be effectually prevented, by the mouth of the child being closely applied to the bed-clothes, or other substances in its way. Dr. W. Hunter relates an instance of a child dying, from its face lying in a pool made by the uterine discharges, where not the least suspicion of any evil design appears to have been attached to the mother.‡ A case, in some respects similar, lately occurred to myself. A woman, whom I had engaged to attend in her lying-in, was suddenly taken with labour-pains, rather before the time the event was anticipated. I was sent for shortly after, but before I reached the house, she had been delivered of a male-child, which I found lying dead under the bed-clothes. The mother informed me that the child had been born about half-an-hour, and that she had heard it cry, but as she was alone, she had been unable to give it any assistance. Not the slightest suspicion of any criminal intention could for a single moment be cherished. The woman was married, and had engaged me to attend her some weeks before the event took place. In all cases, therefore, in which death arises from this source, the circumstantial evidence must decide their criminality.

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* Introduction to the Practice of Midwifery, p. 395.

† Foderè, vol. 4, p. 540.

‡ Observations on the uncertainty of the signs of murder in the case of bastard-children.

(*b*) *Omitting* to preserve the necessary warmth of the child. It is needless to dwell upon the necessity of those precautions, which are generally resorted to, after the birth of a child, in order to preserve a proper degree of temperature. They are founded equally upon experience and good sense. If, therefore, they have been neglected in any case, it is just to attribute it to *design*, unless the circumstances of the delivery render it probable that it proceeded from ignorance, or want of the proper means. In either case, however, the physician may be called upon to decide, whether the death is to be attributed to the action of the cold, or to some other cause. The remarks of Foderè on this point are so very just, that I cannot do better than quote him; "If the body of an infant is found stiff, discoloured, shrivelled, and naked, or with only a slight covering on it in a cold place, buried under stones, or under the earth, and from trials upon the lungs it is evident that it has respired; and if the great internal vessels are found gorged with blood, accompanied with an effusion of blood into the cavities, whilst the cutaneous vessels are contracted and almost empty, and when no other cause of death can be detected, one cannot do less than attribute it to the cold, and consider this abandonment and neglect of care, the necessity of which are obvious to the dullest comprehension, as a manifest intention to make away with the child."[*]

(*c*) *Omitting* to administer proper nourishment, may occasion death. It is not easy to say how long a new-born child may sustain life without food. It is evident, however, that it ought not to be delayed for any length of time. Foderè says, the neglect of it for twenty-four hours is not unattended with danger. When death is occasioned by this circumstance, it may be known by the general emaciation of the body—by the fetid and pungent odour which exhales from it, although the death be very recent—by the eyes being open, and of a red colour. On dissection, the intestines are found completely empty—the gall-bladder enlarged—bile is effused into the stomach and intestines—the lungs appear withered, although without any lesion; and otherwise, all the viscera are in a sound condition.[†]

(*d*) *Omitting* to tie the umbilical cord. The majority of medical practitioners, from the time of Hippocrates down to the present day, concur in the necessity of tying the cord, to obviate fatal hæmorrhage which might ensue from the omission of it. Such was the unanimity of opinion on this subject, that previous to the 17th century, a doubt was not entertained with regard to it. According to Foderè,[‡] *J. Fantoni*, professor of anatomy at Turin, was the first who suggested that this precaution was useless, and that the neglect of it was unattended with any danger to the life of the child. After his time, the same opinion was adopted and defended by *Michael Alberti*, in 1731, and *J. H. Schultzius*,[§] in 1733, both professors in the university of Halle. In 1751,

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[*] Foderè, vol. 4, p. 505. [†] Foderè, vol. 3, p. 238. [‡] Ibid. vol. 4, p. 502.

[§] In a dissertation, entitled, An Umbilici deligatio in nuper natis absolute necessaria sit, Halæ, 1733.

Kaltsmidt maintained the same doctrine at Jena.[*] The arguments offered by them in defence of their opinion are the following: 1st, They maintain that the umbilical vessels, whether cut or torn, have a sufficient contractile power to prevent any great loss of blood. 2d, That, because in other animals it is not necessary to tie the cord, therefore it is equally useless in the human species. 3d, Kaltsmidt adduces an argument from the analogy of arteries contracting spontaneously in some surgical operations, and he thence infers, that a similar contraction would take place in the vessels of the cord.[†]

All these arguments are, however, inconclusive, when subjected to the test of fair inquiry. They consist either of bold assertions, or false inductions. With regard to the *first,* it is by no means true, as a general rule, that the umbilical vessels do contract sufficiently to prevent fatal hæmorrhage. A few cases are indeed related, to the truth of which it would be difficult not to give our assent, but they may be considered as solitary exceptions, when it is known that almost every practitioner in midwifery can testify to the fatal effects resulting from a wilful or accidental neglect of tying the cord.[‡]

The *second* argument is no less unfounded than the first. That there is some difference in the structure of the human cord and that of other animals, is not merely a rational conjecture, but proved by actual observation. Professor Brendel, in examining pups and heifers, found their umbilical vessels full of rugæ, or folds, throughout the whole of their course, and their size much less, also, in proportion.[§] In another place, the same writer says, that in brutes the vessels of the cord are much smaller than in man, and that when the animal is born, they are, in a measure, closed by a kind of cellular structure.[||]

From this it appears, that in brutes there is a peculiar construction of the vessels of the cord, tending to interrupt the flow of blood through them, and favouring their speedy contraction after they have been cut. Besides, the manner in which the cord is separated in brutes facilitates contraction. It is never *cut* in them; it is *torn asunder,* and the disposition of a vessel to contract under such circumstances is much greater.

The *third* has still less force than either of the foregoing arguments. That arteries of inconsiderable magnitude sometimes contract spontaneously, is granted. But that vessels of a size equal to that of the umbilical ones, do contract of themselves, cannot be admitted, when we know that very dangerous hæmorrhages sometimes occur from vessels even much smaller than those of the cord.

If, therefore, it can be proved that this precaution has been wilfully neglected, it is perfectly fair to impute it to an intention to destroy the child. It should not be forgotten, that in many instances it may result from ignorance, as in a first case of pregnancy, where the mother may be wholly unacquainted with the danger arising from the neglect of this circumstance.[¶]

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[*] Foderè, vol. 4, p. 509.

[†] Mahon, vol. 2, p. 422, &c.

[‡] Burns' Midwifery, p. 447, 3d ed. Hosack's MS. notes on Mid. &c. &c.

[§] Medicina Legalis sive Forensis, p. 19.

[||] Ibid. p. 189.

[¶] At all events, it will always be useful to a lawyer, as the assumption of the ignorance of the prisoner will make a good argument in her defence.—Editor.

As death arises here solely from the loss of blood, it may be detected by an examination of the heart and arteries. It is well known, that in the bodies of those who have not died of hæmorrhage, the arteries are found empty, whilst the heart and the veins are distended; hence, if not merely the arteries but also the heart and veins of a child are found destitute of blood, it is a certain proof of its having died of hæmorrhage.

Infanticide by commission. (*a*) *Premature tying of the umbilical cord.* We know that the circulation by the cord, and respiration, are vicarious functions, and if one be interrupted or destroyed before the other is in operation, life must cease. It is accordingly laid down as an invariable rule by practical writers, that the cord should never be tied, or divided, until respiration has been perfectly established.* It would be difficult, however, when death arises from this source, to impute it to a malicious design, as the presumption would generally be, that it arose from ignorance, except where a professed accoucheur was implicated.

(*b*) *Wounds and bruises.* These resemble so much similar injuries in the adult, that it is useless to dwell at any length upon them. It should be recollected, that the heads of children are sometimes very much swollen from compression, during a difficult and tedious labour. This, therefore, should not be confounded with those swellings and bruises which are consequent upon blows voluntarily inflicted after birth.†

One of the most common methods of destroying a child, appears to have been that of thrusting a sharp instrument into its head through the fontanelles. Gui-Patin relates of a midwife who was executed at Paris for having murdered several children, by plunging a needle into the head while presenting at the os externum.[*] Brendel also speaks of the same horrible practice. An instance of this kind is related by Belloc, where, upon examination, he found the instrument had penetrated to the depth of two inches into the substance of the brain.[†] In such cases, it is necessary to shave the head, when a slight ecchymosis will be found around the puncture; and it is then proper to pursue the examination into the substance of the brain, to discover the extent of the wound. Indeed, this minute anatomical investigation is absolutely requisite to detect the nature of the injury, for tumours and extravasations on the scalp and other parts of the body may occur during delivery, and wholly unconnected with any malicious intent. Needles, or other sharp instruments, are sometimes thrust into other parts of the child, such as the temples, the internal canthus of the eyes,[‡] the neck, the thorax about the region of the heart,[||] and the abdomen. Similar investigations with those above-mentioned must be resorted to in all these cases, and where, from the situation of the wound, it is evident that it must have been inflicted after delivery, particular attention must be paid to the state of the lungs, to discover if the child had respired.

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* Burns' Midwifery, p. 447, 3d ed.

† To ascertain the effects upon the head of a child falling from different heights, the following very instructive experiments were made at the Lying-in Hospital, and are detailed by Lecieux:

"1st. Fifteen infants, who had died after their birth, but in whom there was no alteration in the bones of the cranium, were selected, and after having been raised up by the feet so that the head was at the height of about eighteen inches, were suffered to fall perpendicularly upon a hard floor, and by anatomical examination, it was found that in twelve of them there was a longitudinal or angular fracture of one of the parietal bones, and sometimes of both.

"2d. In the same manner fifteen infants were suffered to fall from a height of three feet, and on dissection there was found, in twelve cases, a fracture of the parietal bones, in some extending to the os frontis. When suffered to fall from a greater height, the membranous commissures of the cranium were relaxed, and even broken in some places; frequently the form of the brain was changed, and in some cases there was found under the meninges, or in the thick part of the meninges, an ecchymosis, an extravasation of blood produced by the rupture of vessels; and it was only in infants whose bones were very soft and flexible, that no fracture was found.

"3d. After having placed on a table the head of a child that had died soon after its birth, it was pressed in different places very strongly by the two thumbs, on different parts of the surface; and in fifteen experiments of this kind, seven caused longitudinal fractures of greater or less extent in one or other of the parietals; in others, there was only perceived a depression or sinking of the bones. In the greatest number, the head was deformed or flattened, and the membranous commissures exhibited a sensible relaxation.

"4th. Finally, the head, supported on a table, was struck strongly, and in different places, with a short round stick. This experiment always caused a deformity or flattening of the head, multiplied fractures, with separation of splinters, relaxation, in some places, rupture of the sutures, and finally extravasation of blood."—Dict. des Sciences Med. and West. Quarterly Reporter, No. 3.

In all examinations of contusions, two cautions ought to be observed: viz. to distinguish them from the discoloured spots which appear on the surface of the body at the commencement of putrefaction, and, not to confound accidents which may occur during dissection, with those resulting from blows and other acts of violence.

(c) The death of a new-born infant may be caused *by preventing its respiration.* This may be accomplished in various ways; viz. by drowning, hanging, or strangulation—smothering under bed-clothes, &c.—suffocating, by thrusting various articles into the mouth and nostrils.

Drowning. If a child is found immersed in water, the questions to be determined are, Was it born alive? and was it put into the water before or after its death?

As the subject of drowning will be discussed in a subsequent chapter, it is unnecessary to say any more concerning it at present, than that the signs of it in the new-born infant are precisely the same as those in the adult.

Hanging or *strangulation.* Where a cord has been used, a circular mark will be perceived around the neck; in other instances, ecchymoses will be found on the neck—the face livid—tongue swollen and projecting, and mouth frothy. On dissection, the vessels of the pia mater and the jugular veins are gorged with blood, and the lungs are livid and covered with spots. It is objected to the correctness of any decision unfavourable to the accused, that all these signs may have been the result of accidental strangulation, from the umbilical cord encircling the neck of the child while yet in the uterus. Instances of this kind have doubtless occurred,[*] but they are rare, and can only happen when the cord is of an extraordinary length.[†] They can also be very easily distinguished from wilful strangulation after birth, by experiments upon the lungs. In the former, the child cannot have respired; and this will be indicated by the application of the various tests which have been pointed out. Besides this, there are other marks of discrimination. In the latter, there are perhaps the traces of fingers left on the neck in the form of ecchymoses, or an excoriation of the epidermis; while in the former, from the lubricity of the umbilical cord, this will not be found.

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[*] Mahon, vol. 2, p. 409.

[†] Cours de Med. Leg. p. 93.

[‡] Prælect. Academ. J. G. Brendelii, p. 188.

[||] Foderè, vol. 4, p. 492.

There is another accident sometimes occurring to the cord, which it is of consequence to recollect. It is the formation of *knots* in it, occasioned probably by the child passing through a coil of it during labour. Smellie relates an extraordinary instance of this kind.[‡] A similar one fell under the notice of Dr. Hosack.[||] Now, in cases of this kind, where the child was born dead, or died a short time after birth, ignorance might impute the existence of these knots to a criminal intention on the part of the mother. The method of detecting this, is similar to that in the former case. The length of the cord must be noticed, as they can only take place where it is very long; and experiments must be made upon the lungs to determine if the child was born alive.

When the child has been *smothered* under bed-clothes, &c. the circumstances upon which to form a decision, that wilful murder has been committed, besides those which characterize strangulation generally, are, the place where the body is found—the floating of the lungs—and the absence of any other probable cause to which its death can be attributed.

When respiration has been interrupted by *articles put into the mouth, nostrils, or throat,* dissection can alone detect the cause.

The child may also have been suffocated by the turning back of the tongue upon the epiglottis. This can only be caused when there is some natural deficiency in the frænum of the tongue, or when it has been lacerated, either by the child itself in the act of sucking, or by the application of violence. If, therefore, a child has not sucked, and the frænum is found torn, it is just to conclude, that it must have been the effect of criminal interference.[§]

(d) Luxation and fracture of the neck has been caused by forcibly twisting the head of the child, or pulling it backwards.[¶] In such cases, the vertebræ are fractured, the ligaments ruptured, and death is caused by the injury inflicted upon the spinal marrow. This will be known from the local derangements, and from the position of the head; and, on dissection, from the blood found effused amongst the

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[*] Burns' Midwifery, p. 142, 3d ed.

[†] Burns says the usual length of the cord is two feet, p. 142.

[‡] Smellie's Midwifery, vol. 2, p. 142. Burns' Midwifery, p. 142.

[||] New York Med. and Phys. Journal, vol. 2, p. 20.

[§] Foderè, vol. 4, p. 495.

[¶] Mahon, vol. 2, p. 409.

cervical muscles, or in the vertebral canal, and from the fracture of the first or second vertebra, or both.

(*e*) *Exposure to noxious airs.* This is a mode of destroying life which cannot be frequently resorted to. Women have been known, however, to destroy their offspring by exposing them to the fumes of sulphur. According to Alberti, this may be known, on dissection, from the livid appearance of the lungs.[*]

(*f*) *Poisons.* These may be introduced into the system in various ways. They may be inhaled into the lungs, in the form of odours—or they may be taken into the stomach, mixed with food—or they may be received in the form of injections—or be absorbed through the skin.

When the poisonous substance has been taken into the stomach and intestines, it should be carefully examined, and subjected to the various tests which chemistry supplies for detecting its presence. In cases where the cutaneous absorbents have been the medium of conveying it into the system, it may be very difficult, generally, to discover the cause of death. In some instances, an eruption on the skin, and the peculiar odour of the substance which has been employed, aided by circumstantial evidence, may lead to a discovery.

Such are the various means resorted to, for the purpose of causing the death of a new-born child. It may be almost superfluous to suggest, that extreme caution is always necessary in making up a decision in a case of infanticide. A child sometimes expires in convulsions, a short time after birth, without any evident cause. At other times, its death may be occasioned by causes perfectly natural, and yet so far concealed from observation, as to create suspicions of violence having been inflicted. Introsusception is said to be common to children,[†] and of course can only be detected on dissection. The premature obliteration of the foramen ovale,[‡] as well as its imperfect closure, may also, without doubt, sometimes occasion its death.

Having ascertained that the child was born alive, and that its death was owing to violence, we are next to inquire into the relations of the child with the supposed mother. As already stated, the questions here to be investigated are the following:

1. Has the woman been really pregnant? For the necessary information on this head, see chapter 6.
2. Has she been actually delivered? See chapter 7.
3. Does the pregnancy and delivery correspond as to time, &c. with the appearance of the child?

Circumstantial evidence. Although this does not strictly appertain to a medical discussion of this subject, yet there are some points embraced under it, concerning which the testimony of the physician may be required.

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[*] Mahon, vol. 2, p. 409.

Livor of appearance, where no better proof exists, must go for nothing. Any one who has attended much to dissection, must have seen innumerable instances of every shade of livor, and in all the different viscera of the thorax and abdomen, for which no satisfactory reason could be found in the previous history of the disease of which the subject died.—EDITOR.

[†] Male's Medical Jurisprudence, p. 101. [‡] Mahon, vol. 2, p. 406.

1. It may be urged in excuse for a woman on a trial for child-murder, that from the uncertainty of the signs of pregnancy, she might have been ignorant of her actual condition, and therefore might have been suddenly overtaken with the pains of labour, when it was out of her power to command assistance, and thus the child have lost its life. To all this, a very plain and concise reply may be made. However difficult it may be for a physician to say positively in all cases whether a woman is pregnant or not, yet we can scarcely suppose the woman herself to entertain any doubt on the subject. If she has yielded to the solicitations of a seducer, and if she afterwards experiences those changes and developements in her system which accompany a state of impregnation, she cannot but be conscious of her true situation, and therefore any arguments drawn from this source ought to have no weight.

2. It may be suggested, in vindication of the woman, that the delivery was so rapid that it was out of her power to procure assistance, or make the necessary preparations for preserving the child's life. In cases of first pregnancy, it is not very probable that the labour would be so speedily accomplished. The necessary dilatation of the parts would require a length of time sufficient to give her proper warning of the impending event. In succeeding labours it is possible that it might occur. Dr. W. Hunter relates a case of this kind, which happened in his own practice.* The physician should, therefore, always inquire if this be a first child, or if she has had others previously. Other circumstances relating to the delivery should also be investigated. It is not impossible that a woman may be delivered while standing, and the child have fallen upon the floor, and thus its death have been occasioned. Such cases are, however, extremely rare, and should be admitted with great caution.

4. *Of the method of conducting anatomical examinations in cases of infanticide.*

In every case of infanticide, so much depends upon the testimony furnished by the physician, that it becomes a sacred duty on his part to investigate, with the utmost fidelity and impartiality, every circumstance which may aid him in coming to a satisfactory and enlightened decision. The labour of such investigation is doubtless great and unpleasant; but unless submitted to by the professional witness, he certainly cannot be considered as qualified to give his evidence in a case which involves the life of a fellow-being.

External appearances of the child. These should first be minutely examined and recorded. The most important of them are the following:—

1. The general shape and conformation of the child—whether it be natural or otherwise.
2. Its size—(see page 117 of this work.)
3. Its weight—(see page 116 of this work.)

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* Observations on the uncertainty of the signs of murder in the case of bastard children.

4. All appearances of external violence.

5. Every indication of putrefaction—ascertaining, as far as possible, the extent to which it has proceeded.

6. Its colour. It has been proved, by the observations of anatomists, that the fœtus in utero undergoes a succession of changes with regard to its colour. In the earlier months of pregnancy, the fœtus is pale-coloured. Afterwards, as the circulating system is developed, the skin assumes a bright red appearance, which is lost again as the fœtus approaches to maturity. If, therefore, the skin be found of a red colour, it is a proof that the fœtus, when born, had not reached the full period. It should not be forgotten, however, that an immature fœtus may have lost its natural redness from hæmorrhage, and also that a mature fœtus may become livid, in consequence of a difficult birth.

Dissection of the child. Having completed the external inspection of the child, it becomes necessary, in the next place, to make a careful and minute investigation of its internal condition. For this purpose it will be found most convenient to commence the dissection with the mouth, and the cavities leading to the chest. An incision should first be made from the under-lip to the top of the sternum, and another along the lower edge of the inferior maxillary bone; after which, the integuments are to be dissected back. The lower jaw is then to be divided at its symphisis, and the two portions separated. By bending the head back, we shall now be able to obtain a complete view of the cavity of the mouth. The position of the tongue should now be examined. If any foreign matters are found in the mouth, they should be especially observed and noted. In short, every unnatural appearance, whether morbid or artificial, should be carefully investigated and recorded.

The larynx and trachea must next be laid open. If any fluid is found, it should be recorded.

So much of the œsophagus as can be seen is also to be examined.

The abdomen is next to be examined. The first incision is to be continued down to the lower part of the sternum, and from this point, an incision made through the integuments to the spine of the ilium on each side. The triangular flap thus made, is then to be turned down, and the umbilical vessels be examined and tied. The diaphragm is to be observed, whether it be much arched towards the thorax or otherwise. The viscera of the abdomen are next to be inspected, and every thing peculiar in their appearance or condition to be noticed. The ductus venosus should be examined, whether it be pervious, and contains any blood. After tying the vessels leading to the liver, it should be taken out and weighed. The whole of the intestinal canal, with the stomach, should be taken out, after having tied the two ends. The contents of the stomach to be critically investigated. If there is any suspicion of poison, the ordinary tests for ascertaining it should be resorted to. The state of the gall bladder and urinary bladder should be inquired into, whether they be empty or not. Lastly, it should be seen whether there be any meconium in the intestinal canal.

In opening the thorax, the ribs and sternum must be divided in the ordinary manner; and, in doing this, a pair of scissors will be found a much more safe and convenient instrument than a scalpel. Having exposed the thorax to view, the general appearance, position, and colour of the lungs are to be remarked.

The trachea is now to be divided as near as possible to the lungs. The aorta and vena cava are to be tied and cut. The lungs should then be taken out and weighed, and after this, subjected to the experiments already detailed. (See page 170.) The heart is next to be examined, and it should be particularly noted whether the auricles and ventricles are filled with blood—whether the ductus arteriosus contains blood—and lastly, whether the foramen ovale be still open. As the death of an infant may not unfrequently be caused by injury inflicted on the spine, it becomes necessary to examine this part also. A longitudinal incision should be made from the occiput to the sacrum—the muscles to be separated and turned back. By means of strong scissors, the vertebræ are then to be divided on each side. The posterior part of the spine thus separated, may easily be removed, and the whole canal exposed for examination.

In opening the head an incision should be made from the lower part of the frontal bone down to the second or third cervical vertebra, and another at right angles to this from ear to ear. By dissecting back the integuments thus divided, the cranium will be completely exposed. The cranium should now be carefully examined, to see if there be any fractures, punctures, wounds, &c. The bones are next to be removed, and the most convenient method of doing this will be to separate them by a scissors along their membranous connection with each other. Great care should be taken not to occasion any laceration during the dissection.

The substance of the brain must be carefully investigated, and every deviation from the natural and healthy state observed. Although this examination of the brain can throw no light upon the question whether a child has been born alive, yet it may aid us materially in detecting the cause of its death.

Having completed the dissection, the inferences to be drawn from the information thus obtained, must be obvious. They have been so fully explained in the former part of this chapter as to render unnecessary any recapitulation.

5. *Of the prevention of infanticide, including a history of legislation on the subject, and an examination of the effects of foundling-hospitals.*

Infanticide, which at one period prevailed so universally and without restraint among the most polished nations of the world, is now considered in all enlightened countries as a crime of the deepest dye. Mankind, on this subject, have vibrated from one extreme to the other, and it is not to be questioned, but that in the present day, many an innocent female is wantonly sacrificed to suspicion and prejudice. The *principle*, however, which now guides the moral judgment of society on this subject, is undoubtedly just, for it is a crime which presupposes the obliteration of these feelings which human nature ought to be most proud of, and which, if countenanced, or but slightly punished, would lead to the most dreadful consequences.

That a young female of character and reputable connexions, and possessed of tender sensibility, may have been betrayed by the arts of a base seducer, and when reduced to a state of pregnancy, to avoid the disgrace which must otherwise be her lot, may stifle the birth in the womb, or, after it is born, in a state of phrenzy, imbrue her hands in her infant's blood, in the expectation of throwing the mantle of oblivion over her crime, is a case which too frequently occurs. But even such a case, with all its palliations, cannot be considered as less than wilful murder, and as such demands exemplary punishment.

It is not, however, enough for a wise legislation merely to punish crimes after they are perpetrated: it should also adopt the most effectual means of preventing their commission altogether. In the language of a philosopher, it may be said, that "the punishment of a crime cannot be just, if the laws have not endeavoured to prevent that crime by the best means which times and circumstances would allow."*

With regard to infanticide, it is impossible to suggest any method of arresting it completely, unless there be a total reformation of that corruption of manners which lies at the root of the evil. Next to this, the dread of severe punishment is the most effectual preventive. Foundling-hospitals were also founded with this intent: whether they have this tendency, I shall consider presently, after having enumerated the laws enacted by different nations, for the purpose of preventing and punishing this crime.

Laws against criminal abortion. Although the Jewish code specified nothing relative to criminal abortion, or to the murder of the newborn infant, yet it decreed, that if a pregnant woman should be *accidentally* injured in a fray between two men, so that she proved abortive, without any injury to her own person, the punishment was a fine, such "as the judges might determine." If the woman received any personal damage, the law of retaliation was then to operate—an eye for an eye, and a tooth for a tooth, &c. If she lost her life, death was the punishment.†

After the Romans began to consider the procuring of abortion as a crime, they denounced punishments against the authors of it. These, as has been already noticed, when considering the animation of the fœtus, varied with the changes that took place in the philosophical sentiments of the nation. In the year 692, a council, convened in the palace of the emperor at Constantinople, ordained that it should be punished with the same severity as homicide.‡

In *France*, the Roman law was adopted, and practised upon until the revolution. Their parliaments frequently condemned midwives to be hanged, for procuring the abortion of girls; and physicians, surgeons, and others guilty of this crime, were subjected to the same punishment.|| The French code of 1791, commuted the punishment

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* Beccaria's Essay on Crimes and Punishments, p. 104, New-York ed.

† Exodus, chap. 21, v. 22-23.

‡ Foderè, vol. 4, p. 383.

|| Ibid. vol. 4, p. 384.

to twenty years' imprisonment in chains. The penal code of the empire adopted by Napoleon in 1810, contains the following provisions against this crime: "Every person who, by means of aliments, beverages, medicines, acts of violence, or by any other means, shall procure the untimely delivery of a pregnant woman, although with her consent, shall be sentenced to *confinement*, (reclusion.)

"The same punishment shall be inflicted upon the mother who shall make use of such means, if they are followed by abortion.

"Physicians, surgeons, apothecaries, and other officers of health, who shall prescribe or administer such means of abortion, shall, if a miscarriage ensue, be sentenced to hard labour for a limited time."*

The criminal code of *Austria*, established 1787, by Joseph II., in which the punishment of death is totally abolished, decrees, that "a woman with child, using means to procure abortion, shall be punished with imprisonment for not less than fifteen, nor more than thirty years, and condemnation to the public works; augmented when married.

"Accomplices advising and recommending abortion—imprisonment not less than one month, nor more than five years, and condemnation to the public works. The punishment to be increased, when the accomplice is the father of the infant."†

The laws of Germany punish with from two to six years imprisonment, a woman (or her aiders, &c.) who, by potions or other means, shall have wilfully produced abortion within the first thirty weeks from the time of conception; and the penalty is protracted to eight, or at the utmost to ten years, when such a crime has been committed within the last month of pregnancy.

The laws of Bavaria enact similar measures.

In the Italian code, it is established, that if a woman has used means with the intent to produce abortion, and this shall *not* have taken place, she is to be punished by imprisonment for a period of from six months to one year; but if abortion has been the consequence of such means, the imprisonment is to be from one to five years duration. The same penalties, but with exacerbations, are enacted against the father of the fœtus, if he has been an accomplice in the crime. Finally, the delinquent who, against the will of the mother, shall have caused abortion, or have made an attempt to cause her abortion, is to be punished by from one to five year's severe imprisonment; and if the life of the mother has thereby been brought into danger, or her health injured, the duration of the penalty shall be from five to ten years."‡

The English law is thus stated by Blackstone: "If a woman is quick with child, and, by a potion, or otherwise, killeth it in her womb, or if any one beat her, whereby the child dieth in her body, and she is delivered of a dead child, this, though not murder, was by the ancient law *homicide*, or man-slaughter. But the modern law doth not look upon this offence in quite so atrocious a light, but merely as a heinous misdemeanour."[*] "But if the child be born alive, and afterwards die in consequence of the potion or beating, it will be *murder*."[†] By a subsequent law, enacted in 1803, called the Ellenborough act, it was ordained, that "if any person shall wilfully and maliciously administer to, or cause to be administered to, or take any medicine, drug, or other substance or thing whatsoever, or use, or cause to be used or employed, any instrument, &c. with intent to procure the miscarriage of any woman, *not being*, or not being *proved* to be *quick* with child at the time of committing such thing, or using such means, then, and in every such case, the person so offending, their counsellors, aiders, and abettors, shall be, and are declared guilty of felony, and shall be liable to be fined, imprisoned, set in and upon the pillory, publicly or privately whipped, or transported beyond the sea for any term not exceeding fourteen years."[‡] The same act ordains, that administering medicines, drugs, &c. with the intent to procure abortion *after quickening*, shall be punishable with death.[§]

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* Article 317. For a translation of the whole code, see Walsh's American Review, vol. 2.

† Treatise on the Police of London, by P. Colquhoun, LL.D. 7th. ed. p. 656.

‡ London Med. and Phys. Journal, vol. 43, p. 96.

The *Law of Scotland*, on this subject, appears to differ. Mr. Hume, in his Commentaries on the Criminal Law of Scotland, says, that all procuring of abortion, or destruction of future birth, whether quick or not, is excluded from the idea of murder, because, though it be quick, still it is only *pars viscerum matris*, and not a separate being of which it can with certainty be said, whether it would have become a quick birth or not. Since Mr. Hume wrote, a case occurred in the High Court of Justiciary, where the subject was discussed. A surgeon and midwife were indicted for the violent procuring of abortion, were convicted, and sent to Botany Bay for fourteen years.*

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[*] Blackstone's Commentaries, vol. 1, p. 129. [†] Ibid. Note by Christian.

[‡] Statutes at Large, 43 Geo. III. cap. 28.—Male's Med. Juris. p. 114.

[§] There appears to be a strange deficiency in the English law against the procuring of abortion, *after a woman is quick* with child. The statute prescribes death as the punishment for administering any noxious or destructive substance, with an intent to destroy the child, and yet inflicts no punishment when the same is actually procured by mechanical violence. This defect of the statute was illustrated in a trial which took place in England, in 1808. One Pizzy, a farrier, and another person, (a female) were indicted for administering a noxious and destructive substance to one Ann Cheney, with intent to procure miscarriage. It was proved by the deposition of Cheney herself, that repeatedly during her pregnancy she had taken medicines from the accused without producing any effect, and finally, that a few days before her delivery, he took her up-stairs alone, and introduced an instrument into her body. This was repeated, as the first attempt had not succeeded, and accordingly, after the last one, she had never felt the child move. The jury, however, acquitted the prisoners, expressing themselves not fully satisfied with the evidence to convict. On the trial, the counsel for the prisoner even objected to receiving that part of the evidence which related to his manual operations, as not relevant to the administration of the medicines, which alone constituted the capital crime; and the criminal was tried for giving medicine which had no effect, while the actual perpetration of the crime, by mechanical violence, could only be noticed in court as proving the intention with which the medicines were given.—Edin. Med. and Surg. Journal, vol. 6, p. 244.

The case alluded to, is that of the King *v.* Robertson and Batchelor. A similar case of a surgeon, procuring abortion, occurred last year at Aberdeen, and with similar results. The *law*, that is, the *statute law* of Scotland and England, are nearly the same on the subject of procuring abortion; but a discretionary power is vested in the Scottish courts, to inflict arbitrary punishment (that is, punishment not amounting to the loss of life or limb), on any deed obviously committed with a criminal intent. And it was by using this power that the prisoners in both cases were convicted.—Editor.

In the state of *New-York*, there is no statute law by which the procuring of abortion is declared a crime; and it is, therefore, only punishable according to the common law of England, which has been adopted in this country. Lord Ellenborough's act has, however, no force here, and therefore it can only be considered a misdemeanor, and the only punishments which our judges are enabled to inflict, are fine and imprisonment.

In the state of *Connecticut*, the law enacts, that for administering any noxious or destructive substance for the purpose of procuring the miscarriage of a woman quick with child, the punishment, on conviction, shall be imprisonment in Newgate prison during his or her natural life, or for such other term as the court having cognizance of the offence shall determine.†

Laws against the murder of the new-born infant. These, in almost all civilized countries, are capital. Previously to the fourth century, the edicts of the Roman emperors against this crime were partial and ineffectual; towards the latter part of that century, however, it was completely prohibited. The following is the article relating to it in the Cod. Justin. lib. viii. tit. 52. de infant. expositis, 1, 2: "Unusquisque sobolem suam nutriat. Quod si exponendam putaverit, animadversioni quæ constituta est, subjacebit."‡

The emperor Charles V. condemned the mother to death only in cases where it could be proved that the child had been born alive.§

In 1556, Henry II. of France made a law, condemning to death every woman convicted of having concealed her pregnancy, and put to death a bastard-child. This law prevailed until the year 1791,‖ when every thing relating to the concealment of pregnancy was repealed, and death declared to be the punishment of the murder of the child.

The penal code of the French empire enacted, that "every person guilty of assassination, parricide, *infanticide*, or poisoning, shall suffer death."—Art. 302.

Other articles provide against the exposure and abandonment of infants. "Those who shall expose and abandon, in a solitary place, a child under seven years of age, and those who may order it to be exposed, shall, on that account alone, if such order be executed, be imprisoned for a term not less than six months, and not more than two years, and fined from sixteen to two hundred francs."—Art. 349.

And, "if, in consequence of such exposition or abandonment, the child shall be mutilated or crippled, the act shall be considered and punished as in the case of wounds voluntarily inflicted; and if the consequence be death, it shall be considered and punished as *murder*." —Art. 351.¶

The *Austrian law* provides, that "exposing a living infant, in order to abandon it to danger and death, or to leave its deliverance to chance, whether the infant so exposed suffers death or not, shall be punished by imprisonment for not less than eight, nor more than twelve years; to be increased under circumstances of aggravation."*

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* Edin. Med. and Surg. Journal, vol. 6, p. 249. (*See note at bottom of preceding page*, "The case," &c.)

† Revised Laws of Connecticut, p. 152.

‡ Beckman, vol. 4, p. 437.

§ Foderè, vol. 4, p. 396.

‖ Ib. p. 365.

¶ American Review, vol. 2, p. 396.

In *Saxony*, infanticide is punished with the same severity as parricide; the culprit is put into a bag, with a dog, a cat, a cock, and a serpent, and then thrown into the water.†

Although the *Chinese* have no law prohibiting the exposure of children, yet they inflict a slight punishment for the wanton murder of them. The following is the law on that subject: "If a father, mother, paternal grandfather or grandmother, chastises a disobedient child in a severe and uncustomary manner, so that he or she dies, the party so offending shall be punished with one hundred blows."‡

The *English law* on this subject has, within a few years, been materially changed.

By the Stat. 21 Jac. I. c. 27, it is enacted, that "if any woman be delivered of any issue of her body, which being born alive, should by the laws of this realm be a bastard; and that she endeavour privately, either by drowning or secret burying thereof, or any other way, either by herself or the procuring of others, so to conceal the death thereof, as that it may not come to light whether it were born alive or not, but be concealed: in every such case, the said mother so offending shall suffer death as in the case of murder, except she can prove by one witness, at the least, that the child whose death was by her so intended to be concealed, was born dead."§

Upon this statute, Blackstone remarks, "This law, which savours pretty strongly of severity, in making the concealment of the death almost exclusive evidence of the child being murdered by the mother, is nevertheless to be also met with in the criminal codes of many other nations of Europe, as the *Danes*, the *Swedes*, and the *French*."‖

This cruel law has since been mitigated. In 1803, an act was passed in that country, which decrees, that "women tried for the murder of bastard-children, are to be tried by the same rules of evidence and presumption as by law are allowed to take place in other trials of murder; if *acquitted*, and it shall appear on evidence that the prisoner was delivered of a child, which by law would, if born alive, be *bastard*, and that she did, by secret burying or otherwise, endeavour to conceal the birth thereof, thereupon it shall be lawful for such court, before which such prisoner shall have been tried, to adjudge, that such person shall be committed to the common gaol, or house of correction, for any time not exceeding two years."

In the state of *New-York*, we have no particular law concerning this crime, and as the English statutes are not in force, all trials for infanticide must, of course, be conducted according to the common law, and accessary circumstances can only be considered as proving the intent.

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* Colquhoun, p. 66.

† Specimen Juridicum, &c. p. 44.

‡ La Tsing Leu Lee; being the fundamental laws, and a selection from the supplementary statutes of the penal code of China, by Sir George Staunton, F.R.S.—Quart. Rev. vol. 3, p. 312—13.

§ East's Crown Law, vol. 1, p. 228.

‖ Blackstone's Commentaries, vol. 4, p. 198.

In *Massachusetts*, the mere concealment of a bastard-child is punished with a fine not exceeding £50. For concealing the death, whether the child have been murdered or not, the mother is punished by being set on a gallows with a rope about her neck, for the space of one hour, and is further bound to her good behaviour at the discretion of the court. If convicted of the wilful murder of the infant, the crime is murder, and death the punishment.*

In *Vermont*, a law was passed in 1797, punishing with death the murder or concealment of a bastard, if it came to its death by the neglect, violence, or procurement of the mother. This has been repealed, and in the revised laws of that state, it is enacted, that if a woman be privately delivered of a bastard, and it be found dead, and if there be presumptive evidence of neglect or violence on the part of the mother, the punishment shall be a fine not exceeding five hundred dollars, and imprisonment not over two years; one or both at the discretion of the court.†

In *Connecticut*, the law determines, that if a woman conceal her pregnancy, and be delivered secretly of a bastard, she shall be punished by a fine of not more than one hundred and fifty dollars, or imprisonment not over three months. For concealing the death of a bastard, so that it may not be known whether it was born alive or not, or whether it was murdered or not, she is set on a gallows with a rope about her neck, for one hour, and imprisoned for not more than one year.‡

In *New-Jersey*, the concealment of pregnancy, and delivery in secret, is considered a misdemeanor, and punished by fine and imprisonment. Concealing the death of the bastard is also punished by fine and imprisonment at hard labour.§

In *New-Hampshire*, the concealment of the death of a bastard-child, is made a crime, and the punishment directed is sitting on a gallows for one hour, and imprisonment for not more than two years, or in the place of the last, a fine not exceeding three hundred pounds.||

In *Pennsylvania* and *Rhode-Island*, the laws on this subject are very similar. The concealment of the death of a bastard-child is punishable by imprisonment or fine, or both; and a proviso is contained in each, that the concealment of the death of such child shall not be conclusive evidence to convict the party indicted of the murder of her child, unless the circumstances attending it are such as shall satisfy the minds of the jury, that she did wilfully and maliciously take away the life of such child.¶

In *Delaware*, by a law passed in 1719, the concealment of the death of a bastard-child is made a capital offence, except the mother can make proof, by one witness at least, that the child whose death was by her so intended to be concealed, was born dead. This, however, was re-

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* Laws of Massachusetts, 1807, vol. 1, p. 222.

† Laws of Vermont, 1808, vol. 1, p. 349.

‡ Revised Laws, 1821, p. 152.

§ Revised Laws, 1821, p. 247.

|| Laws of New-Hampshire, 1797, p. 269.

¶ Laws of Pennsylvania, 1803, vol. 5, p. 6. Laws of Rhode-Island, 1798, p. 597.

pealed, and I cannot find at present any statute on this subject in the code of that state.*

Foundling-hospitals. Foundling-hospitals, by providing for the support of illegitimate children, are generally considered as a great means of preventing child-murder. The object of these institutions is no doubt commendable, but it is certain that they are not productive of that decided utility which is usually attributed to them, but it is not to be denied that some good results from them, but it is by no means commensurate with the abuses to which they give rise. That they encourage illicit commerce between the sexes—discountenance marriage—increase the number of illegitimate children, and consequently the number of exposures—are facts confirmed by the history of almost every foundling-hospital that has been established. Mr. Malthus states facts of this kind with regard to the Foundling-hospital in St. Petersburgh (Russia.) "To have a child," says he, "was considered as one of the most trifling faults a girl could commit. An English merchant at St. Petersburgh told me, that a Russian girl living in his family, under a mistress who was considered as very strict, had sent six children to the Foundling-hospital, without the loss of her place."† It is not necessary to enter into a laboured course of reasoning, to prove that the effects of these establishments are decidedly injurious to the moral character of a people. It is a position sufficiently self-evident, and as Malthus justly remarks, "an occasional child-murder, from false shame, is saved at a very high price, if it can only be done by the sacrifice of some of the best and most useful feelings of the human heart in a great part of the nation."‡

There is, however, another objection to Foundling-hospitals. The history of such establishments proves that they utterly fail of accomplishing their object, which is the preservation of the lives of children. The records of those which have been kept with the greatest care, exhibit the most astonishing mortality.

In Paris, in the year 1790, more than 23,000, and in 1800, about 62,000 children were brought in; and it is estimated, that eleven-thirteenths of all the foundlings perish annually, through hunger and neglect.§ It is stated also, that vast numbers of the children die from a disease called l'endurcissement du tissue cellulaire, which is only to be met with in the Foundling-hospital.‖ Of 100 foundlings in the Foundling-hospital at Vienna, 54 died in the year 1789. Subsequent accounts of this hospital do not represent it in a more favourable light. In a recent description of this institution, it is stated, that "all attempts to rear the children in the hospital itself had failed. In the most favourable years, only 30 children out of the 100 lived to the age of twelve months. In common years, 20 out of the 100 reached that age, and in bad years not even 10. In 1810, 2583 out of 2789 died. In 1811, 2519, out of 2847 died. Like the cavern of Taygetus, this hospital seemed to open its jaws for the destruction of the deserted and illegitimate progeny of Vienna. The emperor Joseph II. frequently visited this hospital in person, and upon one occasion he ordered Professor Boer to make a series of experiments with all kinds of food, that it might be ascertained how far diet had its share in the mortality. Twenty children were selected, and fed with various kinds of paps and soups, but in a few months most of them were dead."*

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* Laws of Delaware, 1797, vol. 1, p. 67; vol. 2, p. 670.

† Malthus on Population, vol. 1, p. 368—9. ‡ Ibid. p. 370.

‖ Beckman's History of Inventions, vol. 4, p. 456—7.

§ Cross's Medical Sketches of Paris, p. 197.

In consequence of this extraordinary mortality, "in 1813, the government enacted that the foundling-house should serve merely as a depôt for the children, till they could be delivered to the care of nurses in different parts of the country."

In the hospital at Metz, calculation showed that seven-eighths of the whole number of children perished. In an institution of this kind, in one of the German principalities, only one of the foundlings, in 20 years, attained to manhood.†

The Foundling-hospital of London exhibits rather a more favourable picture. The average of those who died there under twelve months, in ten years, was only one in six, and for the last four or five years, even less in proportion.‡

The general fact is, however, sufficiently evident, that the lives of multitudes of children are sacrificed in these hospitals. The causes too are evident. In some instances, it arises from the want of nurses, or the mismanagement and cruelty of those that are employed; in others, from the delicacy of the infant—the want of its mother's nourishment—the vitiation of the air—and the contagious diseases to which children are more peculiarly exposed.

But do foundling-hospitals diminish the number of infanticides? We have no evidence of such a result flowing from them. From the deleterious influence which they have upon the moral feelings of the female sex, we cannot believe that it is the case. And it is accordingly stated, that after the foundling institution of Cassel was established, not a year elapsed without some children being found murdered in that place or its vicinity.§

The following account of the deaths in the different foundling-hospitals of Europe, will afford ample testimony in support of the opinion already advanced. It is taken from the Edinburgh Med. and Surg. Journal, vol. i. p. 321—2.

"In 1751, Sir John Blaquiere stated to the house of commons of Ireland, that of 19,420 infants admitted into the *Foundling-hospital of Dublin*, during the last ten years, 17,440 were dead or unaccounted for; and that of 2180 admitted during 1790, only 187 were then alive. In 1797, he got a committee of the same house appointed, to inquire into the state and management of that institution. They gave in their report on the 8th of May, 1797; by which it appeared, that within the quarter ending the 24th March last, 540 children were received into the hospital, of whom, in the same space of time, 450 died; that, in the last quarter, the official report of the hospital stated the deaths at three, while the actual number was found to be 203; that from the 25th of March to the 13th of April, nineteen days, 116 infants were admitted; of which number there died 112. Within the last six years, there were admitted 12,786; died in that time, 12,651; so that, in six years, only 135 children were saved to the public and to the world.

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* Quarterly Journal of Foreign Medicine and Surgery, No. 2. p. 188.

† Beckman on Inventions, vol. 4, p. 456—7.

‡ Highmore's History of the Public Charities in and near London, p. 727, Rees' Cyclopædia, Art. HOSPITAL.

§ Beckman, vol. 4, p. 456.

In the *Charité of Berlin*, where some enjoyed the advantage of being born in the house, and of being suckled by their mothers six weeks, scarcely a fourth part survived one month.

Every child born in the *Hotel Dieu* of Paris, was seized with a kind of malignant aphthæ, called *le muguet*, and not one survived who remained in the house.

At *Grenoble*, of every 100 received, 25 died the first year; at *Lyons*, 36; at *Rochelle*, 50; at *Munich*, 57; and at *Montpelier*, even 60. At *Cassel*, only 10 out of 741 lived 14 years. In *Rouen*, one in 27 reached manhood, but half of these in so miserable a state, that of 108, only 2 could be added to the useful population. In *Vienna*, notwithstanding the princely income of the hospital, scarcely one in 19 is perserved. In *Petersburgh*, under the most admirable management, and vigilant attention of the Empress Dowager, 1200 died annually out of 3650 received. In *Moscow*, with every possible advantage, out of 37,607 admitted in the course of 20 years, only 1020 were sent out.

CHAPTER IX.

LEGITIMACY.

1. Of the ordinary term of gestation—whether uniform or not. Variation observed among animals in the term of gestation. Causes which, it is supposed, may vary it in the human species—fallacy on these suppositions. 2. Premature delivery. Inquiry as to the period within which a mature child should be deemed legitimate. 3. Protracted delivery. Remarkable cases of it, in ancient Rome, in France, and Germany. Cases which have given rise to medical controversy. 4. Laws of various countries on the subject of legitimacy—Roman, ancient French, Prussian, modern French, Scotch, and English laws—decisions under them. 5. Questions relating to paternity and filiation. Paternity of children where the widow marries immediately after the death of her husband. Cases that have occurred in the Roman courts—in the English courts. English law on this subject. Similitude and colour as evidences of paternity.

This title, under its various denominations, forms a subject of copious and extended discussion with writers on medical jurisprudence. I shall not imitate their example further, than to notice the reasonings they use, and to relate some of the cases they have adduced. The following division will be followed:

1. Of the ordinary term of gestation.
2. Of premature delivery.
3. Of protracted delivery.
4. Of the laws on the above subjects; and
5. Of some questions relating to paternity and filiation.

1. *Of the ordinary term of gestation.*

By the common consent of mankind, the ordinary term of gestation is considered to be ten lunar months, or forty weeks. This period has been adopted, because general observation, in cases which allowed of accurate calculation, has proved its correctness. It is not, however, denied, that differences of one or two weeks have occurred. Dr. William Hunter, in answer to a question put to him on this subject, replied, "that the usual period is nine calendar months, (thirty-nine weeks,) but there is very commonly a difference of one, two, or three weeks."* And it is impossible, indeed, in the nature of things, that this difference should not occur, since females usually calculate from the time when the menses disappear, and pregnancy may occur at any period between the interval.

In particular cases, also, where the menstrual function is irregular or disordered, the danger of mistake is increased, and undoubtedly we may add to these, the variety that occurs in the period of quickening. This we have already shown to be uncertain, yet it is much relied upon by females, and considered a proper æra from which a calculation may be dated.

It would thus appear that, notwithstanding these sources of error, the term of utero-gestation is very nearly uniform in all countries. There are, however, a class of physiologists who doubt this uniformity, and advance various arguments against it.

The first, and in my view the most important, is drawn from the variety observed in the gestation of animals. The ancients, it appears, were aware of this, and have noticed it in their writings. But the individual who has paid the greatest attention to this subject, is M. Tessier. He has been forty years occupied with it, and kept a register of the facts. Out of one hundred and sixty cows, fourteen calved from eight months to eight months and twenty-six days, three at 270 days, fifty from 270 to 280 days, sixty-eight from 280 to 290 days, twenty at 300 days, and five at 307 days.† The same variety was observed with mares; "the greatest difference among them is 132 days, and the prolongations of the period of gestation are more frequent among them than among cows. Sheep carry their young five months. They do not vary more than eleven days, and the aberrations are on the side of premature births. This latitude diminishes in proportion as the periods of gestation in animals are shorter, but not exactly in that proportion. Bitches bear their young two months, and their limits of difference do not exceed four days. But rabbits, which go with young but one month, have a latitude of eight days."[*]

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* Hargrave and Butler's Note 190* to sect. 188 of Coke upon Littleton.

† Foderè, vol. 2, p. 134. There is a misprint as to the last, which I am not able to correct, except by employing the context. It literally stands thus—"*five at three hundred and eighty days, leaving a difference of sixty-seven days between the extremes.*" Cooper, (p. 227,) in his account of the same experiments, mentions that the greatest difference amounted to *eighty-one* days.

These facts certainly go to show that the period of gestation is irregular among animals, and should they be verified by succeeding observers, a strong argument from analogy will be furnished against its uniformity in the human race. It must, however, be recollected that, even if perfectly established, it is only a favourable and not a decisive proof.

But there are causes assigned, by which it is alleged, that the ordinary term of gestation may be varied.

Changes in the constitution of the atmosphere.—These, it is supposed, sometimes exert an important effect on the uterus. The authority of Hippocrates is cited, affirming that a warm winter, accompanied with rains and south winds, and succeeded by a cold and dry spring, causes abortions very readily in females who are to be delivered in the spring. Many physicians are said to have verified this observation in later times, and Foderè himself observes, that at Martigues, in 1806, after a warm winter, an epidemic catarrh broke out, and all the pregnant women miscarried.

The constitution and habits of the females, it is believed, vary it. That part of the sex which reside in cities, and lead effeminate lives, are more liable to variations than others differently situated. The nervous system also may be so affected as to cause similar changes.

The womb may at one time be irritable and at other times passive, and, in this way, the ordinary term will not prove constant.[†]

I will barely remark on these arguments, that experience has, and is constantly refuting them. There is not a practitioner in midwifery who has not, within his own observation, met with cases sufficient to contradict the opinions just advanced.[‡] It frequently occurs that females of the most irritable habits and effeminate course of life, proceed to the ordinary period—nay, it almost universally is so—and although some may be delivered at the 37th or 38th week, yet if gestation be completed much sooner, the size of the child, or the dangers attendant on premature birth, are generally sufficient to prove the nature of the case. As to the effect of epidemic constitutions, it will be observed, that this cannot with fairness be used as a general argument—nor indeed does it prove any thing more, than that the state of the weather may be such as to predispose to abortion.

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[*] Cooper's Tracts, p. 227.

[†] These arguments are taken from Foderè, one of the supporters of the doctrine of protracted gestation. Chap. 8. sec. 2.

[‡] The fact that dead children and twins are born at the regular period, is certainly a strong proof of there being a fixed term of gestation.

2. *Of premature delivery.*

The question which requires consideration under this section, is, whether a child with all the characters of maturity, as we have described them in a previous chapter, can be born before the ordinary term of gestation? And its direct bearing is on the subject of legitimacy. A husband, for example, has been absent from his family, and at the end of seven or eight months after his return, a full grown, healthy child is produced. Is the honour of the female to be impeached, or shall we allow that this variation is possible?

There is an intrinsic difficulty connected with this question, which should lead us to be tender in forming our opinions, and this originates from the variety observed in children when born at the full time. They differ in size, general appearance, healthiness, &c.; and sometimes, indeed, we know, that eight months' children have been observed larger and healthier than those of nine months. The general appearance, then, should be noticed, but not too much relied on, in forming an unfavourable opinion.

It is an unquestionable fact, that there is in many females a disposition to expel the child before the ordinary term. This not only takes place at the 37th or 38th week, when we might suppose that the female had made a mistake in her calculation, but occurs as soon as the seventh month. La Motte, in his Midwifery, mentions of two females, who always brought forth at seven months. Van Swieten says, he has observed similar cases; and Foderè relates of a female, in the duchy of Aost, in the same situation.* It will not, however, be contended, that these are to be considered as indicating a healthy and regular state of the uterine function, but rather as a consequence of disease.

If the question be confined in the manner already stated, we may derive aid from the appearance of the child, and the condition of the mother. And although it may be deemed *barely* possible, that a child born at seven months may *occasionally* be of such a size as to be considered mature, yet I apprehend that the assertion is most frequently made by those whose character is in danger of being destroyed. If a mature child is born before seven full months after connection, it ought certainly to be considered illegitimate.†

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* Foderè, vol. 2, p. 128.

† This, however, I only give as my individual opinion. Valentini quotes a decision, (Pandects, vol. 1, p. 86,) which is very different. The husband had been absent a year, but returned home on the 14th of April, 1656; and on the succeeding 26th of September, his wife was delivered of a living child. The medical faculty of Leipsic decided that it was legitimate, because the mother had laboured under grief and terror during her pregnancy, and because at her delivery she was so weak as to need bathing with wine.

3. *Of protracted delivery.*

It is astonishing, and I will add ridiculous, to view the ardour with which writers have advocated this doctrine. I shall devote this section principally to a statement of some cases which have occurred at various times, and been made the subject of legal investigation.

One of the oldest cases on record is mentioned by Pliny, the naturalist. He states, that the Prætor L. Papirius declared a child, born at thirteen months, legitimate, on the ground that there was no certain period for the completion of gestation. The emperor Adrian, at a subsequent period, as we are informed by Aulus Gellius, declared an infant legitimate which was born eleven months after the death of its father, on account of the unsuspected and undoubted virtue of the widow. A similar case is mentioned by Godefroy, in his notes on the novels of Justinian. A widow was delivered fourteen months after the death of her husband, and her issue pronounced legitimate by the parliament of Paris. It appeared that she had lived with the relatives of her husband, during the whole period of widowhood—that they had never observed any impropriety in her conduct—and they also testified to the deep and constant grief she had manifested for the loss of her partner. The parliament of Paris appears, indeed, to have adjudicated on numerous cases of protracted gestation. Foderè gives an abstract of twelve, which I copy to show the reasons assigned.*

Thomas Bartholin relates of a young girl, at Leipsic, who, on accusing a person of having seduced her, was confined and strictly guarded. At the end of sixteen months she brought forth a child, which lived two days.†

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* Fodere, vol. 2, p. 111 to 115. In 1578, a child born eleven months after the departure of the husband, was declared legitimate, because the husband might have returned during the interval.

In 1626, a child born eleven months after the death of the husband, was adjudged a bastard, on account of the bad character of the mother.

In 1653, a child born eleven months and three days after the death of the husband, was adjudged legitimate.

In 1632, a child born within four days of ten months after the death of the husband, was pronounced a bastard, on account of the character of the mother, and the constant ill health of the putative father.

In 1649, a child born at ten months and nine days, was judged legitimate, though the father had been absent and paralytic.

In 1656, a child born at sixteen months after the death of the husband, was declared a bastard.

In 1664, a child born eleven months after the absence of the husband, was adjudged legitimate, from the possibility that he might have had connection during the interval.

In 1695, a child at eleven months declared legitimate, for the same reason.

In 1705, in the case of a child born twelve months and six days after the disappearance of the husband, an interlocutory judgment was pronounced, as some asserted that he was dead, while the female asserted that she saw him nine months previous to delivery.

In 1756, a child born within six days of a year after the death of the husband, declared a bastard. So also with one born at eleven months and seven days.

In December, 1779, a child born at eleven months and one day after the husband's death, was pronounced legitimate, on account of the irreproachable conduct of the mother.

† Foderè, vol. 2, p. 183.

In 1638, a female brought forth a child one year and thirteen days after the death of her husband. She suffered with severe labour-pains during the whole of the previous month, and the parietal bones of the infant, at birth, were found to be united—no fontanelle being present. It was also added, that she had always been irregular in her calculations with the seven children she had previously borne. The opinion of the medical faculty of Leipsic was required in this case. They replied, that extraordinary cases of protracted gestation, deserving of credit, were related by many authors; that there might be a frigidity of the genital organs, so as to cause a slow increase of the fœtus; and that the long continuance of the labour-pains proved this to be a præternatural case. They therefore decided that the offspring was legitimate.*

In another instance, a man named Gans, after being deemed *in extremis* for eight days, died on the 2d of December, 1687; and, on the 25th of the succeeding October, his wife was delivered of a son. The brothers and sisters of the deceased contested its legitimacy, and an appeal was made to the medical faculty of Giessen. They commence their answer also, by stating extraordinary cases as mentioned by authors, and in this instance decided in favour of its being the child of Gans, because he was weak and feeble at the period of conception, and the mother was of a *frigid complexion;* the fœtus, therefore, would require a longer period to come to maturity.†

There are also some cases which deserve notice, from the medical controversies to which they have given origin. I shall particularly mention two that occurred in France.

Le Sueur, a resident of the city of Caudebec, in Normandy, was struck with apoplexy on the 14th of May, 1771, and died on the 16th. His wife, Maria Rose, had not been pregnant during the six years of their marriage. On the 11th of the succeeding September, she declared herself pregnant; and on the 17th of April, 1772, (eleven months and one day after his death, and eleven months and four days after his illness,) she was delivered of a son. The relatives of the husband contested its legitimacy, and obtained a decree in their favour; but, on appealing to the parliament of Rouen, the cause was, in December 1779, decided in favour of the widow. Her claim was defended on the score of character, and on the possibility of protracted gestation. The former seemed to be most unexceptionable, at least the public opinion was strongly in her favour, and the latter was supported by many extraordinary narratives. The work of the celebrated Petit on this subject was quoted, in which he states, that many faculties of medicine, forty-seven celebrated authors, and twenty-three

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* Valentini's Pandects, vol. 1, p. 142. In another case, where the child was born eleven months after the death of the husband, the medical faculty of Leipsic, on the 2d of April, 1680, declared it illegitimate, because it was born beyond the time assigned by Hippocrates. (Ibid. vol. 1, p. 140.) Amman, who reports these cases, observes, that he cannot reconcile the conflicting decisions, except by saying, that the first of these children would become very rich by the decision, while the other was poor.

† Valentini's Pandects, vol. 1, p. 144.

French physicians and surgeons, agree in believing that delivery may be delayed to the eleventh and twelfth month; nay, that it is perfectly demonstrated that this frequently occurs.

Among the quotations from the work of Petit, is the following case related by Heister. A female, the wife of a bookseller, in Wolfenbuttel, was delivered thirteen months after the death of her husband. The individuals interested proposed to contest the legitimacy of the infant, but were deterred on account of her excellent character. So convinced was one Christopher Misnerus, who had acted as shopkeeper during her widowhood, of her virtue and probity, that he married her shortly after, and had two children by her, and each of them were born after a gestation of thirteen months.*

Tracy, a naval physician, deposed in this case, that he knew a female who was delivered at the end of fourteen months. She was in delicate health, and both she and her husband informed him, that there had been no connection since the commencement of her pregnancy.

Dulignac, *chirurgeon-major* to the regiment of Asfeld, testified, that with three children which his wife had produced, the term in two had been thirteen and a half months; and in the third, eleven months; and that he had recognized the existence of each of the pregnancies at four months and a half, by the most infallible sign—the motion of the child.

Lepecq de la Cloture also gave an opinion in favour of the widow, and quoted similar cases from his own observation. This author dwelt much upon the inertness which grief produces on the uterine organs, and conceived that the languor which sorrow causes, may retard the progress of gestation.†

The last case which I shall notice, is one that enlisted all the medical talent of France in its discussion. Charles ——, aged upwards of seventy-two years, married Renée, aged about 30 years, at the commencement of the year 1759. They were married nearly four years without having any issue. On the 7th of October, 1762, he was taken ill with fever and violent oppression, which remained until his death. The last symptom was so severe, that he was forced to sit in his bed, nor could he move without assistance. In addition to these, he was seized with a dry gangrene of the leg on the 21st, and with this accumulation of disease, he gradually sunk, and died on the 17th of November, aged 76 years. Renée had not slept in the chamber during his illness; but about three and a half months after his death, she suggested that she was pregnant; and, on the 3d of October, 1763, (within four days of a year since the illness of her husband, and ten months and seventeen days after his death,) she was delivered of a healthy, well-formed, and full-sized child. The opinion of Louis was asked on this case, and he declared that the offspring was illegitimate. Had he rested at this, even the advocates of protracted gestation might probably not have murmured, as the circumstances were rather too powerful for the interposition of their favorite doctrines. But he took occasion, in his consultation, to attack the opinion generally, and to deny the possibility of the occurrence of such cases. Among the arguments which he adduces, are the following: that the laws of nature on this subject are immutable—that the fœtus, at a fixed period, has received all the nourishment of which it is susceptible from the mother, and becomes, as it were, a foreign body—that married females are very liable to error in their calculations—that the decision of tribunals in favour of protracted gestation, cannot overturn a physical law—and finally, that the virtue of females, in these cases, is a very uncertain guide for legal decisions. "If we admit," says he, "all the facts reported by ancient and modern authors, of delivery from eleven to twenty-three months, it will be very commodious for females, and if so great a latitude is allowed for the production of posthumous heirs, the collateral ones may in all cases abandon their hopes, unless sterility be actually present."[*]

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* This case is related at length, with all its proofs, in Schlegel, vol. 2, p. 92 to 113—Wagner's Dissertation.

† Foderè, vol. 2, p. 185 to 189—quoted from the *Causes Célèbres*.

This reasoning appears to me to carry great weight, and Mahon, in his chapter on this subject, adds several sensible remarks in confirmation of it. He observes, that if the doctrine be true, that the children of old people are longer in coming to maturity, it would have been confirmed by experience, which it is not. Grief also, and the depressing passions, are much relied upon as possessing a delaying power, but certainly these are more apt to produce abortion than protracted gestation. He accounts for the mistakes of married women, by suggesting that the menses may be suppressed, not only from disease, but from affections of the mind, or accidental causes, which do not immediately impair the health, while the increase of volume in the abdomen may originate from this, or from numerous other causes. Towards the conclusion of his remarks, he states a difficulty which, I believe, cannot be readily overcome. If the doctrine be allowed, how shall we distinguish a delayed child from one that is born at nine months; and by what means are we to detect fraud in such cases? Certainly, as far as we can judge from the narratives given, the infants born after protracted gestation, were not distinguished for size, or other appearances of maturity.[†]

A calm and deliberate examination of these histories, must certainly, I think, lead to a total disbelief of the doctrine of protracted gestation. There are many that evidently bear the impress of vice, while the most favourable are so liable to have arisen in error, that scepticism must appear unavoidable.[‡] That a limited variation may, from extraordinary circumstances, sometimes occur, I shall allow so far, as to believe it proper that legislation should make allowances for it. The best and most accurate observers have sometimes met with cases, where the period *seemed* to be somewhat prolonged; but I will venture to add, that the more closely they are investigated, the less will the number appear. Dr. Smellie mentions two instances, in which the females exceeded their reckoning by eight weeks, and Dr. Bartley confirms them by a similar case in his own practice.[*] All these, however, were calculated from the cessation of the menses; and is it not possible that some peculiar circumstances might have caused this, particularly as it was the first pregnancy in two of them? Dr. Hunter, in answer to a question on this subject, observed that he had *known* a woman bear a living child in a perfectly natural way, fourteen days later than nine calendar months, and *believed* two women to have been delivered of children alive, in a natural way, above ten calendar months from the hour of conception.[†]

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[*] Louis' Memoire contre legitimité des naissances pretendues tardives. Le Bas attacked this memoir, and Louis replied in a supplement. Several other physicians, I believe, took part in the controversy.

[†] Mahon, vol. 1, p. 188, 189, 198, 202.

[‡] I have not by any means exhausted the cases on record, of protracted gestation. Those who wish to examine them further, are referred to Foderè, Metzger, Louis, Valentini, Schurigius—together with Schnobel's Dissertation in Schlegel, vol. 4. p. 232. A long list of believers and disbelievers in the doctrine, may also be found in these writers.

I will add, that in England, and certainly in America, cases of protracted gestation are rarely heard of. They appear to have occurred in countries where the administration of justice was arbitrary, or at least fickle and unsteady.[‡]

4. *Of the laws of various countries on the subject of legitimacy.*

Although the decisions on this subject have occasionally been very extraordinary and loose, yet considerable uniformity exists in the laws of various countries.

The Roman law did not consider an infant legitimate which was born later than ten months after the death of the father or the dissolution of the marriage.[§] Such was also the French law prior to the revolution.

A case is said to have been decided by a majority of the judges of the supreme court of Friesland, by which a child was admitted to the succession, though not born till three hundred and thirty-three days from the day of the husband's death, which period wants only three days of *twelve lunar* months.[||] The Prussian civil code declares, that an infant born three hundred and two days after the death of the husband, shall be considered legitimate; and a case has occurred, where one born three hundred and forty-three days after the death of the husband, was adjudged a bastard by the *legislative commission* of that country.[¶]

The civil code now in force in France contains the following provisions. The child born in wedlock has the husband for its father.* He may, however, disavow it, if he can prove, that from the three hundredth to the one hundred and eightieth day before its birth, he was prevented, either by absence, or some physical impossibility, from cohabiting with his wife. An infant born before one hundred and eighty days after marriage, cannot be disavowed by him in the following cases:—1. When he had a knowledge of his wife's pregnancy before marriage. 2. When he assisted at the act of birth, and signed a declaration of it. 3. When the infant is declared not capable of living. Lastly, the legitimacy of an infant born three hundred days after the dissolution of marriage, may be contested.†

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[*] Bartley, sect. 3.

[†] Hargrave's note, as already quoted.

[‡] I recommend to those who intend embracing the doctrine of protracted gestation, an examination of the following case. If they can satisfy their minds respecting it, all difficulties on this subject will vanish. The husband had been absent four years, at the end of which period the wife brought forth a child. She pleaded that her conception had taken place through the force of the imagination alone—"ut mulier per fortem imaginationem putaverit, se in insomniis rem habuisse cum marito, atque sic concepisse." The parliament of Grenoble, to whom this case was referred, declared the offspring legitimate. Metzger, p. 416. Schlegel, vol. 2, p. 148.

[§] Foderè, vol. 2, p. 111.

[||] Hargrave ut antea.

[¶] Metzger, p. 427, 429.

It will be observed, that, by the last section, the child born after three hundred days, is not positively declared a bastard, but *its legitimacy may be contested.* And Capuron, in remarking on this, observes, that it would probably be deemed legitimate, if no legal investigation should take place.‡ The language of this law is also so put, that, in a contested case, all the learning of former times and the innumerable cases related by medical jurists, might be brought forth to prove that eleven and twelve months are possible and even probable.§ I confess, that I prefer the Scotch law, because it prevents

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* The rule of the Roman and Scotch code is "Pater est qui nuptia demonstrat." Vide note, p. 51.—EDITOR.

† Code civil. sects. 312, 314, 315—quoted by Capuron and Foderé.

‡ Page 231.

§ The remark made in the text, is amply verified by a case contained in the *Causes Célèbres* of Mejan. As it occurred but a few years since, I shall present a sketch of its leading particulars.

Catherine Berard was married on the 25th of July, 1806, to François Chapellet, who, about six months after, was seized with a pleurisy, and languishing with it about eight days, died on the 20th of January, 1807. On the 3d of December of the same year, and three hundred and sixteen days after his death, she was delivered of a child, of which she declared the deceased Chapellet the father. An application was made to the court at Chambery for the property to which this birth entitled her, and it was resisted by the relatives of the husband, on the ground of illegitimacy. She pleaded their cruel usage during her widowhood, the state of poverty and sorrow to which she was reduced by their treatment, and the fact, that at the expiration of nine months she had experienced labour-pains, which continued until the middle of the tenth—as explanatory of this protracted gestation. The court, after quoting the article in question, from the Napoleon code, argued that it gave the child a *provisionary* legitimacy, until the contrary was proved by concurring facts and circumstances. They further observed, that the term of gestation, in this case, did not exceed that allowed by many celebrated physicians, as possible; and remarked that the widow must have been in a state of sorrow and languor, in consequence of the treatment of her relatives, and thus the increase of the fœtus was probably retarded. Accordingly, on the 14th of April, 1808, a decree was pronounced, declaring the child legitimate. An appeal was taken from it from the court of appeals at Grenoble. M. Metral, the advocate for the mother, advanced in his pleadings most of the arguments which we have already noticed,—such as the variety in the period of gestation, quoted numerous cases from medical authors, and urged the decisions of the French courts as precedents in the present instance. The modesty and good conduct of the mother was not forgotten, nor the fact, that she had experienced labour-pains at the end of nine months. The court, in their *arrêt textuel*, observe, that as the 315th article of the Napoleon code declares, that the legitimacy of the child born three hundred days after the dissolution of marriage this. It is concise and decisive. "To fix bastardy on a child, the husband's absence must continue till within six lunar months of the birth. And a child born after the tenth month, is accounted a bastard." *

The English law, on which our own is founded, does not prescribe a precise time. There are however some decisions, which will show the ordinary course of adjudication. In the eighteenth year of Edward the first, Beatrice, the wife of Robert Radwell, was delivered of a son, eleven days after forty weeks. The husband had been seriously ill, and had no access to his wife for one month before his death. The child *was presumed* to be a bastard, and judgment was given accordingly. Gilbert De Clare, earl of Gloucester, died on the 30th of June of the 7th of Edward the second, and on the 29th January of the 9th year (within one day of a year and seven months) his sisters and co-heirs prayed livery. The countess pled that she was big with the earl, which was accordingly found *per inquisitionem.* The question hung in deliberation, nor did they obtain livery till the 10th of Edward. In another case, during the 18th year of Richard II. Andrews, the husband, died of the plague. His wife, who was a lewd woman, was delivered of a child forty weeks and ten days after the death of the husband. Yet the child was adjudged legitimate and heir to Andrews, for *partus potest protrahi* ten days *ex accidente.*†

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may be contested; it by implication destroys its claim in a disputed case, and affixes a term beyond which gestations are to be deemed illegitimate. Again, the 228th and 296th articles of the same code forbid a widow or divorced female to marry, until ten months after the dissolution of marriage. Here again the term of three hundred days appears to be pointed out as the most extensive period allowed to pregnancy. The father also, by the 312th article, is permitted to disavow the child, if he proves a physical impossibility of cohabiting with his wife for ten months previous. The court contend, that the contesting of the legitimacy, on the part of the relatives, is equivalent to a disavowal on the part of the putative father, and conclude with remarking, that any extension beyond the term of three hundred days must prove dangerous to morals, and the repose of families. They therefore declared the child in question illegitimate. Causes Célèbres, par Maurice Mejan, vol. 6, p. 98 to 120. The editor is not satisfied with the reasoning of the court, and insists greatly on the effects which grief may produce in protracting pregnancy.

* Erskine's Institutes of the Law of Scotland, quoted in the Edin. Med. and Surg. Journal, vol. 1, p. 334.

† These cases are taken from Hargrave's and Butler's notes on Coke upon Littleton. Note 190, on sect. 188. There is a more full report of the case of Andrews in Croke, Jac. p. 541. It is stated that "the husband's father abused her, and caused her to lie in the streets; and three physicians (two of them doctors of physic,) made out that the child came in time convenient to be the child of the dead party, and that it is usual for a woman to go nine months and ten days, *i. e.* solar months at 30 days, and not lunar months. And that by reason of want of strength in the woman or child, or from ill usage, she might be a longer time, viz. to the end of ten days or more. And the physicians further affirmed, that a perfect birth may be at seven months." I have also met with a comparatively recent case, which does not appear to have been noticed. It is contained in Brown's Chancery Cases, vol. 3, p. 349. *Foster and others v. Cook.* Henry Cook died on the 14th of January, 1780; and on the 9th of Nov. 1780 following, (forty-three weeks except one day,) his widow was delivered of a son. A trial was held, and the verdict was in favour of the legitimacy of the offspring.

Messrs. Hargrave and Butler, in commenting on the above cases, observe, that "these precedents, so far from corroborating Lord Coke's limitation of the *ultimum tempus pariendi* (forty weeks) do, upon the whole, rather tend to shew, that it hath been the practice in our courts to consider forty weeks merely as the more *usual* time, and consequently not to decline exercising a discretion of allowing a longer space, where the opinion of physicians, or the circumstances of the case, have so required."* If then a contested case should ever arise in our courts, the opinion of any and every medical man may be brought forward, in order to decide on it. I doubt whether this is calculated to subserve the ends of justice, and should certainly advise that a positive time be fixed by statute in all countries, beyond which children should be deemed illegitimate. In the instance of posthumous children, this term should be narrowed down as much as possible, for husbands have not often the power of procreation for some time before their death, unless it has been sudden and accidental. It is evident, then, that a calculation, commenced from the day of their death, must lead to the encouragement of vicious practices, and the injury of legal heirs. A more clement rule might be allowable in cases of absence, for obvious reasons; but in all, I beg leave to propose, that the law, or (if not the law) at least the practice under it, should declare a child born naturally forty-three weeks after death or absence, illegitimate.†

5. *Of some questions relating to paternity and filiation.*

These form a proper supplement to the present chapter, from their connection with its leading subject.

It might be supposed that common decency, as well as a proper respect for the opinions of mankind, would prevent those sudden marriages which sometimes take place immediately after the death of a former husband. There have, however, been females in all countries, who have disregarded these restraints, and united themselves to a second partner before the "first brief week of mourning is expired." Besides the injury that such cases produce on the public manners, there is a difficulty which may arise in a legal view. *She may be delivered of a child at the expiration of ten months from the death of the first husband;* and the question then occurs as to the paternity of the infant.

The Romans endeavoured to prevent this, by forbidding the widow to marry until after the expiration of ten months; and this term was prolonged, by the emperors Gratian and Valentinian, to twelve. This law has been imitated in the present French code, which also forbids the marriage before ten full months have elapsed since the *dissolution* of the previous one.*

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* Blackstone, however, intimates, that a child born after forty weeks is illegitimate. Vol. 1, p. 456. He cites Britton for this; but the co-editors remark, that even this writer seems to extend in some degree beyond forty weeks.

† I choose this term, because it goes as far as the French code, and the *belief* of Dr. Hunter; although I am free to declare, that the term of forty weeks, particularly after the death of the husband, is more consonant to my ideas of right.

But if these laws are transgressed, or if there be no laws (as in England and our own country) against such precipitate connexions, whom shall we declare to be the father of the child? I will answer this, by citing some cases, and then mentioning the laws in force respecting it.

About the period when the plague broke out in Naples, one Antoine, aged forty, married Jeronime, a young lady, and on the second day after, died of that fatal disease. Aniello, a relative and intimate friend of the widow, having obtained the necessary dispensation, married her immediately afterwards. She was delivered of a child two hundred and seventy-three days after the consummation of the marriage with Antoine, and two hundred and sixty-eight after her union with Aniello—being in the one case thirty-nine weeks, and in the other thirty-eight. The question, *who was the father of this child?* was put to Zacchias.

In order to solve the difficulty, he canvassed the condition of the two husbands, the mother, and the child. Antoine, he observes, was of a feeble constitution, and his marriage was a forced one, and contrary to the wishes of the female, who was attached to Aniello. The latter was strong and robust. The wife stated that the consummation of the first marriage was attended with a discharge of blood, which she attributed to menstruation—that in the interval of her widowhood, it had slightly returned, but never after the second marriage. Now, from this, it might be supposed, that as menstruation had not returned regularly since the first marriage, the pregnancy was caused by Antoine. Zacchias, however, supposes, that the sanguineous discharge was the consequence of defloration, and that as she received the advances of her first husband with disgust, the suppression might arise from mental uneasiness. He attaches no importance to the fact, that if the child was the son of the second husband, the period of pregnancy would fall short of nine months, and thinks it sufficiently counterbalanced by the youth of the parties. He therefore decided, that it was the child of Aniello.†

In another case, a widow married shortly after the husband's death, and, in the fifth month of her second marriage, was delivered of a son, who survived. He was baptised by the name of the second husband, and when he arrived of age, claimed to be acknowledged as his son, and to be supported accordingly. The tribunal of the Rota, after taking the advice of physicians and lawyers on the subject, decided that he was not the offspring of the second marriage, on the ground that a five months birth was not *viable*, or could not have survived.[*]

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* Foderè, vol. 2, p. 205. "The same constitution," says Blackstone, "was probably handed down to our early ancestors from the Romans, during their stay in this island, for we find it established under the Saxon and Danish governments. *Sit omnis vidua sine marito duodecim menses.* Blackstone, vol. 1, p. 457. It was the law before the Conquest.

† Zacchias. Consilium, No. 78. See also No. 75, for a somewhat similar case.

There are also some English cases on record. In the 18th of Richard the second, a woman, immediately after the death of the first husband, took a second, and had issue born forty weeks and eleven days after the death of the first husband. It was held to be the issue of the second husband. In another instance, "Thecar marries a lewd woman, but she doth not cohabit with him, and is suspected of incontinency with Duncomb. Thecar dies—Duncomb, within three weeks of his death, marries her, and two hundred and eighty-one days and sixteen hours after his death, she is delivered of a son. Here it was agreed, 1. If she had not married Duncomb, without question the issue should not be a bastard, but should be adjudged the son of Thecar. 2. No averment shall be received that Thecar did not cohabit with his wife. 3. Though it is possible that the son might be begotten after the husband's death, yet being a question of fact, it was tried by a jury, and the son was found to be the issue of Thecar."[†]

The English law on this subject is thus explained by Blackstone and Coke. "If a man dies and his widow soon after marries again, and a child is born within such a time, as that by the course of nature it might have been the child of either husband, in this case he is said to be more than ordinarily legitimate, for he may, when he arrives at years of discretion, choose which of the fathers he pleases."[‡]

It has also been suggested, that the resemblance of the child to the supposed father might aid in deciding these doubtful cases.[§] This, however, is a very uncertain source of reliance. We daily observe the most striking difference in physical traits between the parent and child, while individuals, born in different quarters of the globe, have been mistaken for each other. And even as to malconformations, although some most remarkable resemblances in this respect have been noticed between father and child, yet we should act unwisely in relying too much on them. There is, however, a circumstance connected with this, which when present should certainly defeat the presumption that the husband or the paramour is the father of the child, and that is, "when the appearance of the child evidently proves that its father must have been of a different race from the husband (or paramour) as when a mulatto is born of a white woman, whose husband is also white, or of a black woman, whose husband is a negro."[||] It was on this principle that a curious case was decided in New-York some years since.

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[*] Zacchias. Decisiones Sacræ Rotæ Romanæ, No. 45.

[†] Hargrave's notes, *ut antea*. See also Croke Jac. p. 686, for an account of the same case.

[‡] Blackstone, vol. 1, p. 456. Hargrave, as already quoted, and also in note 7 to fol. 8. *a*, intimates a doubt respecting the above doctrine, and suggests that one of the cases quoted would lead to the opinion, that "*the circumstances of the case, instead of the choice of the issue, should determine who is the father.*" This certainly would seem to be the most correct mode of adjudicating.

[§] See Zacchias, vol. 1, p. 146; and Valentini's Pandects, vol. 1, p. 148. *De Similitudine Natorum cum Parentibus.*

[||] Edin. Med. and Surg. Journal, vol. 1, p. 335.

Lucy Williams, a mulatto woman, was delivered on the 23d of January, 1807, of a female bastard child, which became a public charge. On examination, according to our laws, she stated that Alexander Whistelo, a black man, was the father of it, and he was accordingly apprehended, for the purpose of obtaining from him the necessary indemnity for its expenses. Several physicians were summoned before the police justices, who gave it as their opinion, that it was not his child, but the offspring of a white man. Dr. Mitchill however thought it possible, nay probable, that Whistelo was the father. In consequence of this diversity of opinion, the case was brought up for trial before the mayor, recorder, and several aldermen, on the 18th of August, 1808. It appeared in evidence that the colour of the child was somewhat dark, but lighter than the generality of mulattoes, and that its hair was straight, and had none of the peculiarities of the negro race. Many of the most eminent members of the medical profession were examined, and they all, with the exception of Dr. Mitchill, declared that its appearance contradicted the idea that it was the child of a black man. Dr. Mitchill, for various reasons (for which I refer to the account of the trial) placed great faith in the oath of the female, and persisted in his belief of its paternity, although he allowed that its appearance was an anomaly. The mayor (the Hon. De Witt Clinton) and the court decided in favour of Whistelo.[*]

CHAPTER X.

PRESUMPTION OF SURVIVORSHIP.

1. Of the survivorship of the mother or child, when both die during delivery. Cases that have been decided in Germany—in France—in the state of New-York. 2. Of the presumption of survivorship of persons of different ages, destroyed by a common accident. Laws on this subject. Roman—Ancient French—Napoleon code—English. Cases that have occurred under each. Propriety of having fixed laws on this subject.

This interesting as well as intricate question has frequently been the subject of legal inquiry. It is agitated, when two or more individuals have died within a very short period of each other, and no witnesses have been present to notice the exact instant of dissolution. Accidents also, such as fire, or a shipwreck, may destroy persons, and the disposition of their property will depend on ascertaining the survivorship of the one or the other. It is not to be supposed that medical science can solve the difficulty, but it may in these extreme instances, where no aid can be derived from facts, assist in laying down certain principles. I shall endeavour to suggest some of these, while relating such cases as I have been enabled to obtain. They may serve as a guide for future investigations.

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[*] See a pamphlet, entitled, "The Commissioners of the Alms-House v. Alexander Whistelo, a black man, being a remarkable case of bastardy, tried and adjudged by the mayor, recorder, and several aldermen of the city of New-York, &c." New-York, 1808. The main scope of Dr. Mitchill's argument appears to have been, that as alteration of complexion has occasionally been noticed in the human subject, (as of negroes turning partially white) and in animals, so this might be a parallel instance. He would also seem to be a believer in the influence of the imagination over the fœtus.

The subject will be advantageously considered, 1. As to the survivorship of the mother or child, when both died during delivery; and 2. As to the survivorship of person of different ages, destroyed by a common accident. This last may seem to include the first, but the distinction which I wish to make, will be readily understood.

1. *Of the presumption of survivorship of mother or child, when both die during delivery.*

The Imperial Chamber of Weztler were consulted at the conclusion of the seventeenth century, concerning the case of a mother and child, who, some years previous, had both died during delivery. There were no facts on which an opinion could be founded, and the naked question was presented. They decided, for *physical reasons*, that the mother had died first. And the commentator, in noticing this case, remarks, that undoubtedly these physical reasons were, 1. that the mother was exhausted by the labour; and 2. that the infant would not have died, until deprived, by the death of the mother, of its nourishment.*

It is questioned, by medical jurists, whether this decision is correct, and there are certainly many reasons to be assigned why the presumption should be against the child. Its life may be early endangered by a difficult or slow delivery. There may be a pressure on the umbilical cord, or the placenta may be partially detached, and its death ensue during the consequent hæmorrhage. If the parturition be complicated with convulsions, the probability certainly is, that the infant will first die. So also if it be very large, or if it be prematurely born. The only exceptions which have been suggested in favour of the survivorship of the child, are the following—when the mother is delivered of twins, she may bring forth the first and died before the second is born—and again when she is laboring under an acute disease. We know that the offspring is sometimes healthy, although the mother sinks during the delivery.†

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* Valentini's Pandects, vol. 1, p. 3 and 11. The statement given of this case by Foderè, and after him by Capuron, is not correct. The chamber assign no reasons except "*causis physicis*," and it is the editor who explains them. There is evidently a mistake in the references to Valentini by Foderè, (vol. 2, p. 96;) and it is of such a nature, that one might be led to suspect that he had not minutely examined the Pandects.

† Foderè, vol. 2, p. 94. Capuron, p. 135 to 148.

A due comparison of these arguments, I imagine, will lead to the opinion, that the presumption of survivorship is with the mother; for I will again mention, that in these cases, no person is supposed to have been present to witness the death of the parties; and such a length of time has also elapsed, that all examination as well as inquiry into facts is precluded.

A case that occurred to Pelletan may be mentioned in this place, although the consideration of it partly belongs to a previous chapter (*on the life of the infant.*)

A female at the eighth month of pregnancy died of a disease, which the physicians styled anasarca complicated with scurvy, (*anasarque compliquée de scorbut.*) A surgeon immediately performed the cæsarean operation, and extracted the child. In his *proces verbal* he states, that after tying the umbilical cord, and removing the mucus from its mouth, he observed pulsations at the region of the heart, and also found that it preserved a sufficient degree of warmth. It expired however, (he adds,) three quarters of an hour after the decease of its mother. Six witnesses were also present at the operation, four of whom stated that they applied their hands to the breast and felt the pulsation. The other two had not observed it.

Pelletan was desired to examine this testimony, and to give an opinion whether the child had actually survived its mother. He remarks that there are certain causes of death which may destroy the mother while the life of the infant may be preserved; of this nature are sudden accidents, as drowning, a blow on the head, or violent hæmorrhage. Fœtal life is even compatible with some inflammatory complaints, but the probability is certainly against the surviving of the child, when the mother dies from a lingering and wasting disease. For this reason, and also because it does not appear to have arrived at the full time, he was of opinion that the child had died in the womb. As to the signs of life, even if they were fully substantiated to have been present, he conceives them equivocal—the pulsation and heat were probably the remains of fœtal existence. And, if the surgeon was correct in believing that the heart beat for three quarters of an hour, he was certainly blameable in not using means to promote respiration. But the probability is, that he was deceived.

For these reasons, Pelletan gave it as his opinion that the mother survived the child.*

I have been favoured with a communication on this subject by the Hon. De Witt Clinton. Some years since, he informs me, a case, embracing the succession to a large landed estate, was tried in one of our courts under the following circumstances. The mother and child both died during delivery. If the latter was found to have survived, the father, by our law, was the heir; if the former, her relatives became entitled to the property. On the trial, it was proved that the child was born alive; and the question of the priority of death was then decided against the parties claiming as heirs of the mother.

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* Pelletan, vol. 1, p. 322 to 341.

2. *Of the presumption of survivorship of persons of different ages, destroyed by a common accident.*

It will readily be observed, that if a father and son, or a husband and wife, perish in one common accident without witnesses, disputes may arise concerning the disposition of their property. Provision has accordingly been made in several codes for the avoidance of such difficulties. I shall give a concise sketch of these, interspersed with cases, to shew the course of legal decisions on this curious subject.

The earliest ROMAN LAW on this point, directs the order of succession when persons of different ages die in battle. If two individuals of this description fell at the same time, he who had not arrived at the age of puberty, was to be deemed to have died first; but if a father, and a son arrived at his majority, lost their lives together, the son was considered to have survived the father. In process of time, this provision was extended to all cases where the precise period of death was unknown, and it was decreed, that, in the case of a husband and wife, the former should be adjudged the survivor.*

The spirit of these laws guided the decisions of the continental tribunals for many ages; and Zacchias, in his elaborate discussion on this question, cites cases from several jurisconsults, which were settled according to the dicta of the civil code. The mother, in one instance, was shipwrecked with her young infant; and, in another, she, with her two children, also young, were killed by lightning. In both these, the parent was deemed the survivor.†

Our author, also, in his *Consilia*, relates two cases, which deserve mention in this place.

A number of individuals perished by the fall of a building, and among these, a father aged sixty, and his son aged thirty, The bodies were found ten hours after the accident. That of the father was uninjured; but, on the head of the son, there was a severe wound. The heirs of each put forth their claims, and Zacchias was consulted by the judges on the case. After a long comparison between the strength and state of health of the parties, he comes to the conclusion that the son survived the father. Being aware, however, that the wound in question was supposed to have accelerated the death of the son, he endeavours to avoid this difficulty by suggesting, that it was not necessarily mortal, nor of a nature to destroy his strength immediately, while the suffocation was so much more urgent a cause of death, that the father, from his valetudinarian state, and his advanced age, would first be destroyed by it.‡

The propriety of this opinion is controverted by Foderè, and with considerable shew of justice: for certainly a wound of the head, and of so severe a nature, may safely be considered the most sudden destroyer of life under the above circumstances.*

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* Digest, lib. 34, tit. 5, *de rebus dubiis*. "Cum pubere filio mater naufragii periit. cum explorari non posset, uter prior extinctus sit, humanus est credere, filium diutius vixisse. Si mulier cum filio impubere naufragio periit, priorem filium necatum esse intelligitur," &c.

† Zacchias, vol, 1, p. 440, 441.

‡ Consilium, No. 51.

In another instance, a man and his family had eaten very copiously of poisonous mushrooms. They were all taken ill, and the domestics were sent to obtain assistance. Before they could return, the husband and wife had both expired. This couple, two years previous, had made an agreement, that whoever survived should possess the sum of two thousand crowns, and, on the disposition of this, a dispute necessarily arose. Zacchias, when consulted, gave his opinion that the husband had survived the wife. His reasons were the following: the husband, though sixty years of age, was robust and healthy, and, from the deposition of the servants, appears to have eaten but few of the mushrooms. The wife, on the contrary, although only forty, was asthmatic, and subject to affections of the stomach. She had eaten largely of the mushrooms, and added to these, other indigestible food. A poison, therefore, which acts violently on the organs of respiration, would soonest destroy one already diseased in those parts.†

Foderè objects to this decision, that the opinion of the poison acting on the organs of respiration is altogether hypothetical, and it probably is so; but certainly the general course of reasoning appears correct.

The ANCIENT FRENCH LAW, in its adjudications, generally followed the Roman. In 1629, a mother, with her daughter, aged four years, was drowned in the Loire. The parliament of Paris, on appeal, decided that the youngest had died first. Some years after, however, an opposite decision was pronounced by the same body. The mother, (*Bobie*) and her two children, one aged twenty-two months, and the other eight years, were murdered secretly in the night. The husband claimed the property of his wife, on the ground that the children had survived, and the parliament adjudged it to him.‡ The discrepancy in this case is very naturally explained by Foderè. Murderers would first destroy those whom they most dreaded, and afterwards proceed to the completion of their intended enormities.

Ricard, a celebrated advocate of the seventeenth century, has preserved a very curious case on this subject.

In 1658, a father and son perished in the famous battle of Dunes; and at noon, the same day, the daughter and sister became a nun, whereby she was dead in law. The battle commenced at that very hour. It was enquired which of these three survived, and it was decided that the nun died first. Her vows being voluntary, were consummated in a moment; whereas the death of the father and brother being violent, there was a possibility of their living after receiving their wounds. It was then necessary to decide between them, and, after some disputation, it was agreed to follow the Roman law, and to declare that the son, being arrived at the age of puberty, survived the father.§

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* Foderè, vol. 2, p. 320, 321. † Consilium, No. 85.

‡ *Causes Célèbres*, quoted by Foderè, vol. 2, p. 218.

§ Foderè, vol. 2, p. 220. Smith, p. 382.

In 1751, a merchant, aged fifty-eight, with his wife aged fifty, and his daughter of twenty-seven years, was drowned, with many others, in endeavouring to cross the Seine in a small vessel. The question of survivorship was raised by the relatives, and an opinion was given on the case by the celebrated Lorry.* He observes, that three causes probably conspired to accelerate the death of these individuals—fright—excessive coldness of the water, and any disease that might be present. Throughout the whole of his argument, he appears to proceed on the supposition, that the younger female was menstruating, and hence that the cold water, by checking it, would hasten her death. But this is not stated in any part of the case, and it certainly is very questionable whether, as he would seem to insinuate, that state of fullness of the system which menstruating females have, would accelerate the suffocation produced by drowning. If his argument means any thing, it is certainly directed to this point; and we have then to compare the probable state of a female of fifty, who is beyond the menstruating period, and another labouring under that function. Certainly it will not counterbalance the difference in age and strength. He, however, gave it as his opinion that the daughter died first. But the parliament of Paris, by a decree of the 7th of Sept. 1752, admitted the presumption of survivorship to her, and ordered a disposition of the property accordingly.†

It thus appears, that, for a length of time, the provisions of the Roman law were followed in France. But a curious distinction was made. The legal tribunals regulated the descent of property by them, but would not apply them to cases where legacies were bequeathed, and for this reason. It is necessary (say they) that a man should have heirs, but it is not necessary that he should have legatees; and accordingly, when testator and legatee died at the same time, the property passed to the heirs. The lieutenant of a vessel bequeathed the sum of two thousand francs to his captain, by a will which he made before going to sea. Both captain and lieutenant were lost in the same vessel, and when a law-case was raised as to the legacy, the property was adjudicated in the manner above stated.‡

The PRESENT FRENCH LAW, on this subject, is contained in the following sections of the civil or Napoleon code.

"If several persons, naturally heirs of each other, perish by the same event, without the possibility of knowing which died first, the presumption as to survivorship shall be determined by the circumstances of the case; and, in default thereof, by strength of age and sex.

"If those who perished together were under fifteen years, the oldest shall be presumed the survivor.

"If they were all above sixty years, the youngest shall be presumed the survivor.

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* This opinion, or "*Consultation de Medicine*," is published at full length in Mahon, vol. 3, p. 152. It is signed by Doctors Payen and Lorry, but was written by the latter.

† Foderè, vol. 2, p. 220, 316.

‡ Foderè, vol. 2, p. 221.

"If some were under fifteen, and others above sixty, the former shall be presumed the survivors.

"If those who have perished together, had completed the age of fifteen, and were under sixty, the male shall be presumed the survivor, where ages are equal, or the difference does not exceed one year.

"If they were of the same sex, that presumption shall be admitted which opens the succession in the order of nature—of course, the younger shall be considered to have survived the elder."[*]

Although these provisions are in the main founded on correct physiological principles, yet there are some objections of weight pointed out by Foderè. The clause that adjudges the survivorship to those under fifteen, when they and persons above sixty perish together, is certainly imperfect, since it may include infants of one, two, or three years. These certainly would expire the soonest. And again, no provision is made for the case when persons under fifteen and under sixty perish together.[†]

The ENGLISH LAW appears to have no provisions on the subject, except so far as the civil law is incorporated with it. There are, however, some cases which deserve mention.

In 1772, General Stanwix and his daughter set sail in the same vessel from Ireland for England. They were shipwrecked, and not a single person on board was saved. The representative of the father to his personal estate was his nephew, and the representative of the daughter was her maternal uncle. These parties brought the case into chancery. On behalf of him whom the General's survivorship would have benefitted, it was argued, that the ship being lost in tempestuous weather, it was more than probable that the General was upon deck, and that the daughter was down in the cabin, (as is almost ever the case with ladies in these situations,) and of course subject to more early loss of life than her father, who, as a man of arms and courage, was, it was asserted, more able and more likely to struggle with death than a woman, and in which he might probably have been assisted by the broken masts, and other parts of the rigging.

On the other side it was contended, that the General was old, and consequently feeble, and by no means strong enough to resist the shocks of such a terrible attack; that the daughter was of a hale constitution, and though of the weaker sex, yet being younger than her father, was proportionably stronger, and, from the circumstances of youth, more unwilling to part with life; and that the probability of survivorship was therefore infinitely in favour of the daughter.

A second wife of General Stanwix also perished with him, and her representative brought forward a separate claim to the disputed property.

The court, however, finding the arguments on all sides equally solid and ingenious, waived giving any decision, and advised a compromise, to which the several claimants agreed.*

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[*] Civil code, sects. 720, 721, 722—quoted by Foderè, vol. 2, p. 222, and Smith, p. 379.

[†] Foderè, vol. 2, p. 223 to 226.

Another case I have obtained from an English newspaper, but there is probably no doubt of the general correctness of the report. It was tried in the Prerogative Court, Doctor's Commons.

Job Taylor, quarter-master-sergeant in the royal artillery, had made a will, in which he appointed his wife, Lucy Taylor, sole executrix and sole residuary legatee. Having been for some time in Portugal on foreign service, he was returning home with her on board the Queen transport, when the vessel in Falmouth harbour struck upon a rock, in consequence of the violence of weather, and sunk almost immediately afterwards. Nearly three hundred persons on board perished, and, among them, Taylor and his wife. Taylor died possessed of property to the amount of £4000, and a bill in chancery was filed by the next of kin of the wife against those of the husband, to ascertain who was entitled to this property, but the proceedings were at a stand for the want of a personal representative of the husband. Both parties, therefore, applied to the court for letters of administration generally, or that the court would suspend granting any to either party during the dependence of the chancery-suit, and in the mean time grant a limited administration. This latter prayer was, however, abandoned, on understanding that the court could not grant a limited administration, where a general one might be granted and was applied for; and the present question therefore was, to whom the general administration should be granted—whether the next of kin to the husband as dying intestate, his wife not having survived so as to become entitled under his will, or the representatives of his wife, as his residuary legatee, she having survived so as to become entitled under that character.

It appeared, from the affidavits exhibited on both sides, that at the time the accident happened, Lucy Taylor was below in the cabin, and her husband on deck. The water was rushing in fast, and he offered large sums to any one who would go below and save her; but, finding none would venture, he descended himself, and the vessel immediately afterwards went to pieces. The bodies of Taylor and his wife were found close together; and it further appeared that she was a woman of a very robust constitution, and in the habit of enduring great fatigue by the management of the officers' mess, as well as that of a great many of the soldiers; whilst he was rather sickly, and had been latterly much afflicted with an asthma.

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* Fearne's posthumous works, pages 38 and 39. This case appears to have attracted the attention of Mr. Fearne, and he accordingly prepared arguments for the purpose of seeing what could be advanced on both sides, with some appearance of reason; and, after his death, they were published in the above collection. The scope of the argument in favour of the representative of the daughter, is, first, to overthrow the probability that they both died at the same instant; and, next, to strengthen the rule of the civil law, that the child shall be presumed to have survived the parent. The argument in favor of the representative of the father, is aimed against the propriety of allowing any weight to presumption, and it urges the known fact, that the father died possessed. This, it is conceived, should destroy a claim founded on the uncertain, unknown possession of a niece. (See page 35 to 72.) Both these *arguments* deserve an attentive perusal.

It was contended, on the part of the husband's next of kin, that, by the principles of the Roman civil law, which had been adopted into the law of this country, and were in fact the only principles governing a case of this kind, it was laid down, that where two persons perished together in a common calamity, and it became a question which of the two was the survivor, the presumption of law should always be in favour of the person possessing the more robust constitution and greater strength, as being thereby the better fitted to struggle with the difficulties of his situation, and resist for a longer time the operation of death. Thus, when the father and the son shall perish together, the presumption of the survivorship is in the favour of the son if above the age of puberty, but of the father if under: the same as to a mother and daughter; and as to husband and wife, the presumption is in favour of the husband. This, however, like all other legal presumptions, was liable to be repelled by evidence to the contrary; but in this case it was contended, from the situation of the wife at the time the accident happened, that it was most probable she had perished before her husband descended to her rescue. Upon both grounds, therefore, both of principle and of fact, the court must conclude that the husband was the survivor, and accordingly grant the administration to his next of kin.

On the part of the wife's next of kin, it was contended, that the presumption of law alluded to was only applicable to cases where parties perish together in such a manner as to preclude the possibility of obtaining any evidence as to which of them was the survivor. Where, however, evidence as to that fact was produced, as in the present case, the case must be decided upon that evidence only. Here it appeared, the parties had perished by the same accident, and their bodies were afterwards found together, and that the common course of nature had in this instance been inverted, by the wife being the most strong and robust of the two. The court must, therefore, necessarily conclude that she was the survivor, and accordingly grant the administration of her husband's effects to her representatives.

Sir John Nicoll observed, that this case presented itself for decision under very singular circumstances. He recapitulated them, and observed, that the question as to the limited administration had not been gone into; but that, with respect to general administration, the counsel had argued upon the legal presumption of survivorship, and whether or not that presumption was sufficiently repelled by the facts in evidence. He agreed to the doctrine that had been laid down, of the presumption being in favour of the husband, but it was a necessary preliminary question upon whom the burden of proof rested. The administration to the husband being the point in issue, his next of kin had *prima facie* the first right to it; but there being a residuary legatee, this right became superseded. The parties claiming under this latter character were not residuary legatees themselves specifically, but merely derivatively from one who was. They were, therefore, one step further removed from the property. The presumption of law was certainly always in favour of the heir at law, with regard to freehold, and equally so of the next of kin with regard to personal property, the statute of distribution disposing of an intestate's property among his next relatives, solely upon the presumption that such was his intention, unless the contrary should be expressed. It was, therefore, incumbent upon the representatives of the wife, in this case, to prove her survivorship, as the party in whom the property vested, and from whom in consequence they derived their claim to it. He then entered into an explanation of the facts in evidence, and was of opinion that they were insufficient to repel the presumption of the husband's having survived the wife, which the court was bound to assume, from the circumstance of their having been overwhelmed by one common calamity, and having perished together; observing, in particular, that though the wife might be very active and laborious in her domestic duties, yet the natural timidity of her sex might prevent exertion in the moment of danger; whilst the husband, on the other hand, though laboring under the bodily affliction of an asthma, might still retain his manly firmness in resisting impending destruction, particularly as, from his situation in life, he must have often faced death in various shapes. He was therefore in no degree satisfied, by the proofs in the cause, that the wife survived the husband, and should therefore decree the administration to his next of kin. In thus deciding the law, however, he did not mean to affirm positively which of the two was the survivor, but merely that there was not sufficient proof that it was the wife, to repel the presumption of law that it was the husband. The administration was accordingly granted to the husband's next of kin.*

A still later case is on record, viz. that of Mason *v.* Mason, which came before Sir William Grant, the Master of the Rolls, in March, 1816. The father, a middle-aged man, embarked with his son on board a vessel in India, on a voyage to England. The ship was lost, and all on board perished. In favour of the son, the civil law and the Napoleon code were cited; but it was replied, that, as the father's will bequeathed certain property to each of his children, "who should be living at the time of his death," it required positive proof, and not presumption. The opposite party cannot prove that the son survived. The master of the rolls appears to have been of opinion against the son; but he finally sent to a jury, to try whether Francis Mason was living at the death of the testator.† The result of this I have not been able to find.

In reviewing these cases, it may probably appear to some that physical principles will never be sufficient to decide with any degree of probability. This, indeed, is the opinion of some medical jurists, as Belloc and Duncan.‡ Others again, aud in particular Zacchias, have laid down rules for judging in all the various kinds of accidents that may occur. Thus, in those dead from hunger, young men should be supposed to have first perished, then infants, and lastly, old men—and as to sex, women probably survive. In cases of drowning, a dissection and examination of the organs immediately acted upon may lead to correct opinions, while in those found dead from noxious exhalations, we should examine the relative situations of the bodies to the noxious air, and the state of thoracic capacity. In all cases, the state of health should, if possible, be ascertained, and apoplectic habits should always be deemed to have been the earliest sufferers.*

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* The title of this case is Taylor and others *v.* Deplock.

† Merivale's Chancery Reports, vol. 1, p. 308.

‡ Belloc, p. 161. Edin. Med. and Surg. Journal, vol. 1, p. 331.

But if the fallacy of these doctrines be urged, it then remains to adopt some positive rules; and, in so doubtful a subject, those which approach the nearest to natural justice will be the best. I cannot, however, agree with a late writer, in proposing, that, in *all cases*, the order of nature should be presumed to have taken place; and that, therefore, if father and child die, whatever be their physical powers or age, the child should be considered as having survived the father, and so in all cases of successions.† Certainly, this would be manifestly unjust, if broadly adopted.

No one, however, will doubt the propriety, and indeed the necessity, of positive laws on this subject. And I must confess that the provisions of the French code, with some modifications, appear to me the best adapted for administering equitably in the majority of cases that may occur.

CHAPTER XI.

AGE AND IDENTITY.

1. Notice of some questions in which the testimony of medical men may be required as to the age of an individual—the age at which he is considered capable of committing certain crimes. The period of absence that is considered as presumptive proof of a man's death. Decisions on this subject in England—in the state of New-York. Age beyond which pregnancy is impossible—Cases. 2. Identity. Cases where physicians may be required to identify individuals by physical marks. Remarkable instances in France—Martin Guerre—Francis Noiseu—Sieur de Caille—Baronet. Effects of age in altering the personal appearance. Remarkable instances of disputed identity at New-York—in England.

Age is a subject of copious discussion with many of the older writers on medical jurisprudence, and even Foderè has enlarged on it in an extended manner. I can however conceive but very few cases, in which a physician can be called on to give an opinion concerning it. There are laws, in all civilized countries, defining the various periods, such as minority, majority, &c. and if the registers or testimonials to prove these are wanting, it is difficult to suggest any physical proofs on which a medical man, more than any other individual, can venture to pronounce decisively.*

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* Zacchias, lib. 5, tit. 2, quest. 12. He also adds, that when persons are destroyed in a fire, those who are suffocated expire before those who burn o death.—See Foderè, vol. 2, p. 228 to 332. Smith, p. 380

† Brande's Journal, vol. 3, p. 41.

There are however exceptions to these remarks, as the readers of these pages must have noticed. It is often of the highest importance to ascertain the age of a fœtus, or a new-born child; but the proofs of these have been more properly, we conceive, investigated in another place. There are, also, some points in the age of individuals which deserve consideration in a treatise on MEDICAL POLICE, such as the proper period for contracting marriage, and the division of life into the different terms of infancy, youth, manhood, and old age.

It is proper, notwithstanding, to make some suggestions relative to this subject.

1. In the English, and in our own laws, certain periods of life are prescribed, before which, individuals shall not be deemed guilty of particular crimes. Thus a male infant, under the age of fourteen, is considered incapable of committing a rape. But it deserves notice, that, occasionally, though of course rarely, there are cases of *early puberty*, where strength and ability are fully sufficient to complete this crime, under certain circumstances. Instances are related where the generative functions have appeared perfect at a very early age, and every mark of manhood has been present.† Whether, in a case of this kind, the premature powers of the individual should not be considered, instead of his actual age, is a question for legislators. While the period is positively fixed by law, no question can be raised concerning it.

2. Metzger suggests another point, which may occasionally require the opinion of a physician, viz.: *How long a period of absence shall be considered as presumptive proof of a man's death?*‡

There are some law-cases which may be quoted in elucidation of this. In Benson *v.* Oliver, in the court of exchequer, 5 George 2d, 1732, before Chief Baron Reynolds. "Upon trial of an issue directed by the court of exchequer, the deposition of a witness, examined in 1672, was offered to be read, without any evidence of his being dead, relying upon the presumption from length of time, which would entitle the reading of a deed at that date. The chief-baron refused to let it be read, saying, a deed had some authenticity from the solemnity of hand and seal. He said, if proper searches or inquiry had been made, and no account could be given of him, he would have admitted it at such a distance of time."[*] Again, in Dixon *v.* Dixon, where a legatee had been abroad twenty-six years, and had not been heard of for twenty-five years, the master of the rolls said he would presume him to be dead.[†] Chancellor Kent, in this state, has decided that ignorance in a family of the existence of one of the children, who had gone abroad at the age of twenty-two, unmarried, and had not been heard of for upwards of forty years, is sufficient to warrant the court, or jury, to presume the fact of his death without issue.[‡]

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* It appears, however, that in certain cases where doubt exists as to the age of an individual, *he is to be brought into court to be inspected by the judges,* whether he be of full age or not. If the court has, upon inspection, any doubt of the age of the party, it may proceed to take the proofs of the fact.—Blackstone, vol. 3, p. 332. See Ponyntz's case in Croke's James, p. 230.

† Instances of premature puberty in the male are related by Drs. White and Breschat, and Mr. South, in the Medico-Chirurg. Transactions. (See vol. 1, p. 276; vol. 11, p. 446, and vol. 12, p. 78.) The subjects were each about three years of age. Ballard mentions a case that lately occurred in Paris, where a female attributed her pregnancy to a boy ten years old. Instances of infantile menstruation are related by Dr. Wall, (Medico-Chirurgical Transactions, vol. 2, p. 116;) and by Astley Cooper, (Do. vol. 4, p. 204.) See also Stalpart, vol. 1, p. 336. London Med. and Phys. Journ. vol. 27, p. 522. Chapman's Journal, vol. 2, p. 198. The Philosophical Transactions also contain several examples of premature puberty in both sexes.—See vol. 19, p. 80; vol. 42, p. 627; and vol. 48, p. 249.

‡ Metzger, p. 242.

The French code is very cautious on this subject. It requires thirty-five years of absence, or one hundred years since the birth of the absent person, before the heirs can demand a division of his property, and be put in definitive possession of it.[§]

In the state of New-York, the presumption of the duration of life is reduced to the period of five years, provided the party has not been heard of during that time, and marriages are allowed to be contracted after the period stated;[||] but the space of seven years is adopted in the act for the more effectual discovery of the death of persons, upon whose lives estates depend.[¶]

3. A third subject discussed under this title has been, *the age at which pregnancy is possible, and beyond which it cannot occur.* The last is said to have been much canvassed in the famous Douglas cause, tried some years since in England.[**] I have already incidentally noticed this in a former chapter, and mentioned some cases of births in females of an advanced age.[††] As to premature pregnancy in European countries, the most astonishing instance probably is given by Meyer, of a Swiss girl becoming a mother at nine years of age.[‡‡] Concerning this and similar cases, we can only say, that they are examples of precocity, resembling those which occasionally occur in the other sex.[§§]

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[*] Strange's Reports, vol. 2, p. 920.

[†] Brown's Chancery Cases, vol. 3, p. 510. "Where no account can be given of a person, the presumption of the duration of life (in England) ceases at the expiration of seven years from the time he was last known to be living."—Phillips' Law of Evidence, p. 152.—See also Doe *v.* Jesson, 6th East's Reports, p. 80.

[‡] Johnson's Chancery Reports, vol. 5, p. 263.

[§] Code Civil, sect. 129.—See the whole chapter.

[||] Revised Laws, vol. 1, p. 113.

[¶] Ibid. vol. 1, p. 103.

In Scotland, so far as marriage is concerned, at least a man is presumed to be dead who is not heard of for seven years, in which case his wife may form a new union, by proclaiming and calling on her husband to appear at the cross of Edinburgh; and, as he may be in a distant country, or at sea, it is necessary to give him a fair opportunity of hearing the summons; the law wisely provides that he shall also be summoned at the shore and pier of Leith. I am not aware that this law applies in cases where property is concerned.—Editor.

[**] Brande's Journal, vol. 3, p. 39.

[††] Vol. 1, p. 120. If such cases present themselves in legal investigations, the proofs in favour of maternity should be clear and decisive. Probably the most remarkable instance on record, *(if true,)* is that related by the bishop of Seez, in the memoirs of the French Academy of Sciences for 1710, of a man in his diocese, at 94, and a woman at 83, having a child.—Memoirs of Literature, vol. 7, p. 78.

[‡‡] Brendel, p. 76. Metzger, p. 480.

[§§] Vide note, p. 83.—Editor.

"The English law admits of no presumption as to the time when a woman ceases to have children, though this enters into most other codes."*

The subject of identity seems to have a connection with the one we have noticed, and, like it, may occasionally require the opinion of physicians.

Cases have not unfrequently arisen, both in civil and criminal courts, where the question at issue has been, *whether an individual be really the person whom he pretends or states himself to be.* The controversy, in such instances, must originate from the resemblance that exists between him and another person; and that this has often been most striking, we have not only the testimony of antiquity, but the experience of all who have had opportunities of extensive observation. The title of one of the chapters of Pliny's Natural History, is *Cases of Resemblance*, and he enumerates several persons who could hardly be distinguished from each other—the great Pompey, from the plebeian Vibius—the consuls Lentulus and Metellus—and the impostor Artemon, from Antiochus, king of Syria.

When cases, in which the identity of an individual is contested, come before a court, the difference of opinion that exists, will generally be of such a nature as to render the duty of the tribunal trying and difficult. This subject is calculated to excite attention, to awaken discussion, and to cause great positiveness of opinion on one or the other side. Every feeling of the heart is enlisted, and the oaths of individuals must necessarily be of the most discordant and opposite nature. It may be stated generally, that, in such instances, the advice of the physician may assist in leading to the detection of falsehood, and the establishment of truth. If there be any thing like positive data, which cannot deceive, he can aid in their developement: and they must be drawn from a source which naturally falls under his province.

The narrative of a few cases will prove the most instructive notice that I can give of this subject.

The most celebrated, probably, that has ever occurred, if not in Europe, at least in France, is that of Martin Guerre, brought before the parliament of Tholouse in 1560. Its incidents are so extraordinary, that many have deemed it a fictitious narrative.

Martin Guerre had been absent from his home for the space of eight years. An adventurer, named Arnald Dutille, who resembled him, formed the design of taking his place, and actually succeeded so far, as to be received by the wife of Martin as her husband, and to take possession of his property. Children were born to this union: and he lived three years in the family, with four sisters and two brothers-in-law of Martin, without their suspecting his identity. It became, however, a subject of dispute. Several hundred witnesses were examined, and of these, thirty or forty swore that he was the real *Martin Guerre;* nearly the same number, that he was *Arnauld Dutille;* while others deposed, that the resemblance between the two men was so great, that they could not decide whether the prisoner was an impostor or not. The perplexity of the judges on this occasion was very great; but, in spite of many things that weakened his cause, they were on the point of deciding in favour of Arnauld, when the arrival of the true Martin developed the deceit. Even when confronted, the impudence and effrontery of Dutille was such as to lead many to doubt, until the brother and sisters of the absent person fully recognized him.

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* The law is thus laid down in Reynolds *v.* Reynolds—Dickens' Reports, vol. 1, p. 374—on a motion to divide a legacy among all the children living at the decease of a father. The father was sixty-two, and the wife of the same age, and infirm, and therefore there was no probability of their having more children. Sir Thomas Clarke, master of the rolls, said, that though it might be improbable, yet it was not impossible, and would have denied the motion; but the father consenting, and the other children consenting, that their respective shares should stand as a security to answer what any after-born child, should there be one, might be entitled to, the court granted the motion.

I am unable to say, whether physical resemblances were much noticed in this case, as the above narrative is all the authentic information that I have been able to obtain concerning it. In the following instances, however, there appears to have been considerable discussion on these points.

A child, called *Francis Noiseu,* born at Paris on the 22d of Dec. 1762, was put to nurse in Normandy. When about sixteen months old, it was taken ill, and in consequence was bled in the right arm. It had also a cicatrix on the inner side of the left knee, from a gathering which had been cured by caustics.

On the 13th of August, 1766, this child, aged three years and eight months, was lost, and could not be found; but, on the 16th of June, 1768, its godmother, seeing two boys pass, was struck with the voice of one of them. She called him to her, and became convinced that it was her godson. The knee and arm were examined, and the cicatrices found.

In the meanwhile another person, the widow *Labrie,* claimed this as her son. It had marks of the small-pox on its body, and this was, on investigation, deemed a strong argument in her favour, since it was not pretended that Noiseu had labored under this disease previous to his being lost. Many witnesses also attested to its being her child. After several examinations before various courts, it was decided that the boy was the son of the widow Labrie.

Foderè impugns this adjudication, and with great appearance of justice. He observes, that there were evidently physical marks sufficient to guide to a proper decision, and that these were disregarded. The cicatrix at the knee, according to one party, was caused by an affection to which *caustics* had been applied; while, according to the other, it had originated from a slight tumour or *abrasion* during the period of nursing. Certainly, surgeons could decide, from the appearance, which of these causes produced it. Again, the boy had a cicatrix on the right arm. The widow Labrie said, her child had never been bled, while it was stated that Noiseu's had. Three surgeons, on examining this cicatrix, declared it was made with a sharp instrument; but others pronounced that it was the consequence of an abscess, and that no mark of venesection was present. Lastly, it was certainly no argument against the maternity of Noiseu that the boy bore marks of small-pox. He was missing nearly two years, and might have suffered under it during his absence. It appears, also, that the subject of the dispute had some peculiarities in shape, which were not properly investigated.

The Sieur *De Caille*, being a Protestant, fled to Savoy, at the period of the revocation of the edict of Nantes. His son died before his eyes at Vevay. Some years after, an impostor pretended that he was the son of this person, and claimed the succession to his property. He was imprisoned, and his cause remained before the parliament of Aix for seven years. Hundreds of witnesses, (among which were the nurses and domestics of the family,) swore that he was the son of De Caille, and the public sentiment was strongly in his favour, as he was a Catholic. Testimonials, sent from Switzerland, that the real son was dead, were of no avail; and the parliament declared, in 1706, that he was what he claimed to be. The wife of this impostor shortly after discovered, that although she had been silent, yet this elevation would not profit her. She therefore began to mention who he actually was, and, on appeal, the cause was transferred to the parliament of Paris. The evidence adduced showed that the son of De Caille had some distinguishing peculiarities in shape and make. He was of small height, and his knees approached each other very closely in walking. A long head, light chesnut hair, blue eyes, aquiline nose, fair complexion, and a high colour, were his other characteristics. The stature of the impostor (Pierre Megé, a soldier,) was, on the contrary, five feet six inches, and his black hair, brown and thin complexion, flat nose, and round head, sufficiently distinguished him from the former individual. Other physical conformations were observed, which it is not necessary to mention, but which strengthened the testimony against Megé. The parliament accordingly decided that he was an impostor.

The last French case I shall mention, is that of *Baronet*. He was born in 1717, in the diocese of Rheims, and left his native place, at the age of twenty-five, in search of a livelihood. Having served as a domestic for a length of time, he returned, after an absence of twenty-two years, to claim the little property left him by his parents. His sister, however, had used it, and she prevailed on a neighbour, named Babillot, whose son had departed about the same time that Baronet went away, to claim her brother. Although the attempt failed, and the individual could not be prevailed on to continue in the opinion that Baronet was his son, yet the sister had sufficient influence to cause her brother to be condemned as an impostor, and to be sentenced to the gallies for life.

A few years produced a revolution in the minds of those who had witnessed this cause, and an appeal was made to the parliament of Paris. The celebrated surgeon, Louis, was consulted, and his opinion inclined in favor of Baronet, who was discharged, and put in possession of all his rights.

The physical facts in this case are so striking, that evidently prejudice, and indeed bribery, must have influenced the first decision. Baronet was sixty years old, Babillot was only forty-six. The father of Babillot swore that his son had a mark, (a *nævus maturnus)* on his thigh, but this could not be found on Baronet. Other peculiarities were also mentioned, which identified the individual.*

An examination of the cases just related, will lead to the conclusion, that considerable importance should be attached to physical signs. The recollection of individuals may be weakened, and even the physiognomy of the persons in question may be altered, while marks will remain which are not to be effaced. It is on such, that reliance should principally be placed; although I am far from denying, that instances may occur where, even in these, a most striking conformity will be observed.

But there is another subject of consideration suggested by the present inquiry, which we must not omit; and that is, the change which a number of years produces, as also the hazard that this alteration may be productive of injury to an individual, in causing doubts of his identity.

A noble Bolognese, named Cassali, left his country at an early age, and engaged in military pursuits. He was supposed to have lost his life in battle, but, after an absence of thirty years, returned and claimed his property, which his heirs had already appropriated to themselves. Although there were some marks which appeared to identify him, yet the change in appearance was so great, that none who remembered the youth were willing to allow that this was the individual. He was arrested and imprisoned. The judges were in great doubt, and consulted Zacchias, whether the human countenance could be so changed as to render it impossible to recognize the person. This distinguished physician, in his consultation, assigns several causes which might produce such an alteration; as age, change of air, aliments, the manner of life, and the diseases to which we are liable. Cassali had departed in the bloom of youth; he then entered on the hardships of a military life, and if the narrative of the individual in question was to be credited, he had languished for years in prison. All these causes, he conceived, might produce a great change in the countenance, and render it difficult to recognize him.

The judges, on receiving this opinion, examined into the physical marks, and as the heirs could not prove the death of Casali, his name and estate were decreed to him.†

It is not, however, in foreign countries only that these difficult cases have happened. An individual was indicted and tried before Judge Livingston, at New-York, in 1804, on a charge of bigamy, and the whole evidence turned on the question of his identity. He was called Thomas Hoag by the public prosecutor, but stated himself to be Joseph Parker. Several witnesses swore that they had known him under the name of Thomas Hoag, among whom was a female whom he had married, and afterwards deserted. It was stated that Hoag had a scar on his forehead, a small mark on his neck, and that his speech was quick and lisping. All these peculiarities were found on the prisoner. Two witnesses deposed that Hoag had a scar under his foot, occasioned by treading upon a drawing-knife, and that this scar was easy to be seen, and had been seen by them. On examining his feet in open court, *no scar was to be found on either of them;* and it was further proved, that at the period of his alleged courtship of the second wife in Westchester county, he was doing duty as a watchman in the city of New-York. The jury acquitted him.*

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* The above cases are all taken from Foderè, vol. 1, chap. 2, who quotes the *Causes Célebres.*

† Zacchias' Consilium, No. 61.

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* This account differs somewhat from the account given in Smith, p. 500. I have taken my narrative from the cotemporary journals of that period, and have reason to believe it perfectly accurate. Dr. Smith also (p. 500) mentions a case that occurred in England in 1817, where, on an inquest, an old man declared a dead female to be his daughter. On investigation, however, the daughter was found alive and hearty, and was produced before the coroner. The resemblance here was very great between the living and dead woman.

When witnesses swear to the identity of a dead person, unless their *causa scientiæ* consist in scars, tattooing, or other indelible marks, their evidence should be taken with the greatest possible caution by the jury, for very soon after death such a total change of the features takes place, that it is impossible for the nearest relations to recognise them. This is finely illustrated in a case tried before the high-court of justiciary in Edinburgh, last winter, (I quote from memory, having no documents.) A resurrection-man was tried for raising the body of a young woman from the church-yard of Stirling—nine weeks after death, the body was discovered and identified by all the relations, not only by the features, but by a mark which they believed could not be mistaken, she being lame of the left leg, which was shorter than the right. There was a good deal of curious swearing as to the length of time after death, that the body could be recognised, but the jury were convinced that the *libel was proven*, and gave a verdict accordingly. Now I am certain that this was not the body of the woman who was taken from the church-yard of Stirling, but one that, at least six weeks after the time libelled and was buried in the church-yard of Falkirk, from which she was taken by this man, who also took the other, for which he was tried—she also was lame of the left leg; thus, though guilty of the offence laid to his charge, he was found guilty by a mistake of the *corpus delicti*.

Considerable interest is at this moment excited in the public mind, by the case of a young gentleman of the name of Robinson, who was tried lately, (July 1824) for divers acts of theft. Many people swore positively to his identity, and the jury found him guilty of several of the acts charged. Yet, on a second trial, when he was sworn to as positively, most satisfactory alibis were proved. The case at present is involved in mystery, but it is generally believed that the King will pardon him, as the second trial has thrown doubt on the first.

Since writing the above, the Royal mercy has been extended to him.—Editor.

CHAPTER XII.

MENTAL ALIENATION.

1. Of the symptoms that constitute a state of insanity. Division of insanity into mania—monomania or melancholy—dementia—and idiotism. *Mania.* Precursory symptoms. Symptoms—state of the countenance—language and actions—disordered appetite—state of the stomach and bowels—condition of the tongue and pulse—insensibility to cold and heat—perversion of the senses—the ear—the eye—the smell, taste, and touch—wakefulness—loss of memory—pusillanimity. Duration of a paroxysm. *Monomania.* Its character. Danger of suicide or violence from the insane of this class. *Melancholy.* Age most liable to it. Symptoms—peculiar cast of countenance—state of the eye—concentration of the thoughts on one idea—fixed position of the body—condition of the pulse—of the skin, tongue, and bowels—peculiar odour. Sanity on subjects not connected with the morbid impression. Length of time that this impression remains. General exemption of infancy from attacks of mania and melancholy. *Dementia.* Generally a consequence of mania and melancholy. Its characteristics. *Idiotism.* Its frequency in some countries, as the Valais and Carinthia—Cretins. Characteristics of idiotism—deformity of the skull—peculiar countenance—affection of various senses. Its complication with other diseases. Other forms of insanity. General causes of it. 2. Of feigned and concealed insanity. Rules for their detection. Remarkable instances of the latter. 3. Legal definition of a state of mental alienation, and the adjudications under it. Common law of England as to idiots and lunatics in civil cases—in criminal cases. Law in the state of New-York in the same cases—method of proving a person a lunatic—method of proving his recovery. Lucid interval—ancient meaning of this term—definition of it at the present day by D'Aguesseau—Dr. Percival—Dr. Haslam—Lord Thurlow—objections of Lord Eldon to the opinion of the latter—application of the term in criminal cases—difficulties on the subject. 4. Inferior degrees of diseased mind. Delirium of fever. Hypochondriasis. Hallucination. Epilepsy. Nostalgia. Intoxication—its presence does not excite from the guilt of crimes—a frequent cause of insanity. Old age. 5. Of the state of mind necessary to constitute a valid will—legal requisites—nuncupative wills—wills disposing of personal property—testaments. Persons who cannot make valid wills. Diseases which incapacitate an individual from making a will. 6. Of the deaf and dumb—their capacity, and the morality of their actions—are to be judged of according to their understanding. A person born deaf, dumb, and blind, is deemed an idiot—if he become so, a *non compos.* A deaf and dumb person may be a witness—may obtain possession of real estate—may be tried for crimes. Cases of each.

I HAVE chosen the term mental alienation, at this time, because it is more comprehensive than others in common use. It permits us to consider, under one title, all those diseased states of mind, which occasionally require the investigation of the medical jurist.

In examining the subject of insanity, I propose to confine myself to those points which are particularly noticed in civil and criminal cases, as it would neither comport with the limits of the work, nor the objects for which it is prepared, to extend the research over that broad field which is usually occupied by the medical pathologist. And we shall find that the symptoms are the important subject of enquiry, since a decision is usually founded on the estimate formed of them.

I shall accordingly arrange my remarks in the following order:

1. The symptoms that constitute a state of insanity.
2. Of feigned and concealed insanity.
3. Of the legal definition of a state of mental alienation, and the adjudications under it.
4. Of inferior degrees of diseased mind.
5. Of the state of mind necessary to constitute a valid will.
6. Of the deaf and dumb—their capacity, and the morality of their actions.

1. *The symptoms that constitute a state of insanity.*

Insanity, in its ordinary acceptation, is usually divided into mania, melancholia, and idiocy; but I prefer the classification proposed by M. Esquirol, as better calculated to illustrate the varied appearances of the disease. The following is the order pursued by him: 1. Mania, in which the hallucination extends to all kinds of objects, and is accompanied with some excitement. 2. Monomania, or melancholy, in which the hallucination is confined to a single object, or to a small number of objects. 3. Dementia, wherein the person is rendered incapable of reasoning, in consequence of functional disorder of the brain not congenital. 4. Idiotism, congenital, from original malconformation in the organ of thought.*

Mania. In many instances, though it is far from being general, pain in the head and throbbing of its arteries precede an attack of insanity; and sometimes giddiness is complained of, as a percursory symptom.† The appearance of the eye is, however, the circumstance most readily to be noticed, and the change in it from a state of health, even precedes incoherence of language. Recovered patients have described a peculiar sensation connected with this appearance, as though the eye flashed fire from being stricken smartly with an open hand, and this increased in proportion as the ideas became more and more confused. There is a peculiar muscular action of these organs, a protrusion of the eyes, a wandering motion, in every possible direction, and in a manner peculiarly tiresome to the beholder. During a paroxysm, they appear as if stiffly and firmly pushed forward, and the pupils are contracted.‡ And yet, with all these appearances of excitement, it has rather a dull than a fierce character.

The muscles of the face also partake in the change, and the rapidity of the alterations they undergo, depends on the succession of ideas which pass with such velocity through the mind of the sufferer.

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* Medico-Chirurg. Review, vol. 1, p. 249, *American edition.* This is an analysis of the masterly article of Esquirol on Insanity, in the *Dictionaire des Sciences Medicales.*

† Haslam on Madness, p. 41. ‡ Hill, p. 68.

As the attack advances, the individual becomes uneasy, is unable to confine his attention, walks with a quick and hurried step, and while doing so, suddenly stops. Men of the most regular and established habits, will suddenly become active, jealous, and restless; they abandon their business, and enter into the most extravagant undertakings; while, on the other hand, some who naturally are of a lively disposition, become indolent and indifferent, fancy themselves sick, or have a presentiment of severe disease. Persons subject to habitual indisposition, which has disappeared suddenly, fancy themselves in high health, and are greatly elated.[*] A very vigorous action of body and mind soon takes place, and particularly the exertion of great muscular strength. And here, it is impossible to present any thing like a description that shall be generally applicable. The language is totally different, both in tone and manner, from the usual habits of the maniac. He becomes angry without any assignable cause—attempts to perform feats of strength, or efforts of agility, which shall strike the beholder with astonishment at his great powers. Many talk incessantly, sometimes in the most boisterous manner, then suddenly lowering the tone, speak softly and whisper. The subjects vary equally. They are never confined long to one point, but voluble and incoherent, run rapidly from one point to another, totally disconnected with it. The same phrase is sometimes repeated for a length of time, or conversation is maintained with themselves, as with a third person, with all the variations of violent, and ridiculous gestures. In females, there is frequently a complication, as it were of hysteria with general madness; and laughing or weeping is a common attendant.[†]

The food necessary for the sustenance of life is often neglected, and fasting is endured for a length of time without any apparent inconvenience; yet, with some, there is an unusual and indiscriminate voraciousness, and they swallow every thing that may come in their way.

The stomach and bowels are unusually torpid—costiveness prevails, and the stools are white, small, and hard. Diarrhœa rarely occurs, except towards the termination of the disease. The urine is scanty in quantity, and, for the most part, of a high colour.

The pulse is very various; sometimes full and laboured, and sometimes natural. But little dependence can be placed on it, as an indication. The tongue is usually moist, and sometimes has a whitish appearance; and there is often a preturnatural secretion of saliva and mucus in the mouth and throat, which is of a viscid nature, and discharged with difficulty by spitting. There is also generally a stoppage of the secretion of mucus in the nose. Dr. Rush mentions, that Dr. Moore, at his request, examined the maniacs in the Pennsylvania Hospital, with reference to this symptom, and found it present in two-thirds of them. Where this secretion was not suspended, he found the mucus of the nose dry and hard.*

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[*] Parkman. I am greatly indebted, in this chapter, to the publications and MS. communications of this learned and diligent examiner of the subject of insanity.

[†] Rush, p. 145.

'Maniacs also endure a degree of heat and cold, which to a sane person would be inconvenient and even distressing. Haslam, indeed, objects to the correctness of this, as illustrated by his own experience, and states that the patients in Bethlem Hospital enjoy no exemption from the effects of severe cold.† They are particularly subject to mortifications of the feet, and such of them as are permitted to go about, are always to be found near the fire in the winter season. Notwithstanding these facts are adverse to the generally-received opinion, yet I apprehend it is, for the most part, found to be correct—at least during the paroxysm. The high degree of mental excitement that then prevails, creates an insensibility to external impressions, and although their effects may be afterwards experienced, as in Mr. Haslam's cases, yet for the present they are unheeded and unfelt. The same operating cause that endows the maniac with excessive strength, doubtless, also, conduces to produce the state under consideration.

The senses are often perverted, and of these, the *ear* more particularly suffers. Haslam observes, that he scarcely recollects an instance of a lunatic becoming blind, but numbers are deaf; and those who are not deaf, are troubled with difficulty of hearing, and tinnitus aurium.‡ It is from the disorder of this organ, and which is referable to the original diseased action of the functions of the brain, that many maniacs derive the delusion under which they labour. The commission which they suppose themselves to receive from some superior being, is given by the ear—they imagine it is constantly repeated. They are thus, they imagine, urged to its performance, and, in too many cases, murder or self-destruction is the unhappy result. "In consequence of some affection of the ear, the insane sometimes insist that malicious agents contrive to blow streams of infected air into this organ. Others have conceived, by means of what they term hearkening wires and whizz-pipes, that various obscenities and blasphemies are forced into their minds: and it is not unusual for those who are in a desponding condition, to assert that they distinctly hear the devil tempting them to self-destruction."§

The *eye* is also diseased. Objects appear bright or fiery, and the organ itself is sparkling and protruded. At other times, it is sunken and dull, and external appearances produce but little impression.

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* Rush, p. 146. † Haslam on Madness, p. 84.

‡ Haslam on Madness, p. 67.

§ Haslam on Madness, p. 69. A curious case is mentioned by our author, (p. 71,) of a patient, who was a well-educated man, of middle age. He always stopped his ears closely with wool, and in addition to a flannel nightcap, usually slept with his head in a tin sauce-pan. Being asked the reason why he so fortified his head, he replied, "to prevent the intrusion of the sprites." He was apprehensive that his head would become the receptacle of these imaginary formations; that they would penetrate into the interior of his brain, become acquainted with his hidden thoughts and intellectual observations, and then depart and communicate to others the ideas they had thus derived. "In this manner," (said he,) "I have been defrauded of discoveries that would have entitled me to opulence and distinction, and have lived to see others reap honours and emoluments for speculations which were the offspring of my own brain."

The *smell* does not escape these perversions, although this is by no means so common as with the other senses. A lady, twenty-seven years of age, in the last stage of phthisis, perceived in her room an odour of charcoal. She immediately conceived that there was a design against her life. She left her lodgings, but the fumes of charcoal incessantly pursued her till her death. So also with the *taste* and the *touch*. The former derives its disorder from the derangement of the stomach; and the latter in many instances has lost its peculiar power of correcting the other senses. Hence the insane frequently deceive themselves in respect to the size, form, and weight of things around them; and the greater number become unhandy in all mechanical occupations, music, writing, &c.* This, however, is far from being universal, as some speak and write with ease, and are remarkable for striking expressions, deep thoughts, and ingenious associations.

Wakefulness is another symptom, which sometimes precedes all others, and is coeval with pain or uneasiness of the head, or of some other diseased organ; and its degree is determined by the age, habits, situation, and original vigorous or feeble constitution of the patient. From its being always followed in the morning by the peculiar appearance of the eye already described, it may sometimes lead to proper suspicion, as well as attention to the diseased person. This watchfulness is attended with an irresistible impulse to rise early, go abroad, and ramble about: or, if remaining in the house, to be incessantly employed in arranging and re-arranging articles of furniture, dress, books, or papers; and, by thus placing, displacing, and confounding every thing, their ideas become more confused, and they soon give rise to actions of the wild and outrageous nature which we have already described.

The memory is early affected in maniacs. After a time, it seems to be almost destroyed. Some, according to Haslam, lose, in a wonderful degree, their former correctness of orthography.

Pusillanimity is also a remarkable trait in the character of the insane. Though occasionally boisterous and fierce, yet they are readily overcome by a person of decision. Their leading characteristics are timidity, distrustfulness, suspicion—never contented with their present condition, but always desirous of some change. It is this discontent of mind that detaches them from their parents and friends, and causes them to hate most those whom they previously cherished with the fondest affection. The exceptions to this are few, and even if they retain the semblance of affection, still they will bestow no confidence on the objects of it, nor pay any respect to their solicitations or advice. This alienation from friends is therefore one of the most constant and pathognomonic traits of the malady.†

The duration of a paroxysm is very various. It continues for days, weeks, months, and even years, and ends in death—a remission—or a perfect and durable recovery. Dr. Rush states, that, in one case which came under his notice, the disease continued from June, 1810, until April, 1811, with scarcely any abatement in the excitement of the body and mind, notwithstanding the patient was constantly under the operation of depleting remedies. He also witnessed another instance, in which the same remedies were insufficient to produce an interruption for five minutes, of speech or vociferations, except during a few short intervals of sleep, for five months.* Others again have paroxysms with chronic, but moderate derangement in their intervals; and, in these intervals, the recovery is sometimes so great as to indicate insanity on a particular subject only. But a reference to this will readily excite a return of general madness.

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* Medico-Chirurgical Review, vol. 1, p. 249. † Ibid. p. 247.

If the paroxysm ceases suddenly, we have reason to dread the return of another. On its cessation, the patient seems waked from a dream; he is exhausted, speaks or moves but little, and seeks solitude; and if there is an approach to reason, he states what he has seen, heard, or felt—his motives and his determinations.†

Monomania or *melancholy*. Here the permanent delirium is confined to one object, or to a small number of them. The sufferers are pursued day and night by the same ideas and affections, and they give themselves up to these with profound ardour and devotion. They often appear reasonable, when conversing on subjects beyond the sphere of their delirium, until some external impression suddenly rouses the diseased train.

The character of the first form (that is, if we subdivide monomania from melancholy) is often very various, depending on the predominant character of the delusion that is present. Some are gay and highly excited—laugh, talk, and sing—fancy themselves deities, kings, learned and noble. Cases of this nature must be familiar to every reader. Foderè mentions one, which is strikingly illustrative. A merchant at Marseilles, aged seventy, and always a decided royalist, had devoted himself to heraldic researches. He was so overjoyed at the return of the Bourbons to France, that he became insane. His predominant mania was to recite, with a loud voice, the history of the kings of France, and to fatigue his auditors with a tedious catalogue of chronological facts. If they listened with patience, he was contented and calm; but if any impatience was manifested, his fury became ungovernable.‡

Some patients, when labouring under this form, are excessively irascible, and even without any apparent cause, are suddenly hurried into a violent passion or fury. It is while labouring under this, that they become dangerous to themselves or to those around them. They will seize any weapon, and strike or injure others or themselves. Sometimes consciousness of their situation is so far present, as to allow them to warn individuals of their danger, or to intreat them to prevent their doing injury. An internal sensation is perceived—as a burning heat with pulsation within the skull, previous to this excitement. This description of lunatics "eat much, but sometimes they endure hunger with great obstinacy; they have frequent pains in the bowels, and costiveness is common.* The pulse is full, hard and strong, and the skin warm."†

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* Rush, p. 162. † Parkman.

‡ Foderè, Traité du Delire, vol. 1, p. 385.

Probably this is a form of insanity as common as any other. It is also said to be less durable, and to end more favourably.

Melancholy is a disease of mature age, and rarely affects young and athletic persons. It is also generally characterized by a peculiar appearance, and particularly by black hair and eyes—by a striking cast of countenance, as the complexion is either yellow, brown, or blackish. This is to be ascribed to a sluggishness and torpor of the cutaneous system, and, in consequence, the impressions of cold and heat are slightly noticed, and sometimes not heeded. The physiognomy is wrinkled and languid, yet sometimes the musles of the face become convulsively tense, and the countenance is full of fire.

The pupils of the eye are dilated, and that organ has a peculiarly dull muddy look, rolling heavily on surrounding objects, if it can be roused to move at all. But ordinarily it is fixed with an unmeaning stare on vacancy. The adnata is commonly painted with a dull purplish red, sometimes on a deep orange-coloured ground, and this especially, when advancing age and hepatic affections exist, or intemperance has long preceded the attack. Holding a strong light near the eyes, produces a very transient effect.‡

Pain is said by some recovered patients to have preceded the attack—sometimes fixed, but more commonly wandering, and the suffering by this is extreme. Great apprehension, which indeed is a characteristic of this form, ensues, and plunges the sufferer into the most gloomy state of mind, accompanied by indifference as to his personal comfort, or urging him forcibly to self-destruction, or to the murder of others. The state of reverie and of delusive ideas gradually becomes more fixed, and the thoughts are concentrated on one mournful topic, until finally he is, as it were, inanimate, motionless, and speechless. A fixed position of the body is a very common attendant. In one instance that occurred to Dr. Rush, the patient sat with his body bent forward for three years without moving, except when compelled by force, or the calls of nature. In another, the sufferer occupied a spot in a ward, an entry, or in the hospital-yard, where he appeared more like a statue than a man. Such was the torpor of his nervous system, that a degree of cold so intense as to produce inflammation and gangrene upon his face and limbs, did not move him from the stand he had taken in the open air.§

The pulse is extremely vacillating, and generally is slow and feeble; yet, with all this, has a labouring feel, not accompanied with a bold throb, but as though difficulty attended every exertion. A sort of ticking movement is sometimes observed, which is often intermitting, giving from one hundred to one hundred and thirty strokes in a minute.*

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* Torpor of the bowels is common to all maniacs; and M. Esquirolle accounts for this fact, by stating, that, in a great majority of cases, there is an unnatural displacement of some of the intestines, more especially of the colon. He also remarks, that where the disease has its seat in the brain, the membranes are more frequently diseased than that viscus itself.—EDITOR.

† Parkman. ‡ Hill, p. 98. § Rush, p. 216.

The skin is dry and burning, while the extremities are cold, and bathed in a clammy sweat. With these, transient purple-coloured flushings of the face are sometimes an attendant. The tongue is usually of a brownish yellow colour, furred, and has intensely purple red edges. Constipation is a very common symptom, accompanied with flatus and eructation; and diarrhœa is uncommon, excepting the disease is about to undergo a salutary change. The urine is pale, thin, and cloudless, unless it be morbidly retained, which some do for several days. The thirst is usually great, and a peculiar odour is perceptible from their bodies.

Watchfulness is also common in this form of disease, and sleep, when it is present, is often broken by nocturnal visions or frightful dreams.

On objects not relating to the subject or passion which characterizes the delirium, they reason and act rightly, and often with great force and subtlety. But the morbid impression once referred to or excited, all is merged in this. And it is equally astonishing and melancholy, how vivid this remains through the long lapse of years. A young clergyman, two days previous to the appointed period of his marriage, was employed in snipe-shooting with a friend. Accidentally, he received part of the charge of a gun in his forehead. He instantly fell, and did not recover for some days, so as to be deemed out of danger; but at the end of this period, it was perceived that he was deranged. The interesting event that was to have taken place, became the leading object of thought, and all his ideas seemed to stop at this. "All his conversation was literally confined to the business of the wedding; out of this circle he never deviated, but dwelt upon every thing relating to it with minuteness; never retreating or advancing one step farther for half a century, being ideally still a young, active, expecting and happy bridegroom, chiding the tardiness of time, although it brought him at the age of eighty gently to the grave."†

There are very few melancholics whose delirium is not exasperated every two days; many have a strongly-marked remission in the evening and after meals; others are exasperated at the beginning of the day or at evening.‡ Haslam also observes, that the symptoms are aggravated by being placed in a recumbent posture. And patients, when in the raving state, seem, of themselves, to avoid the horizontal position as much as possible, and when so confined that they cannot be erect, they will keep themselves seated upon the breech. This remark applies equally to mania and monomania.

I may also in this place add a general remark, with respect to the age most liable to insanity. This is often useful in the formation of an opinion. Infancy seems to be nearly exempted from its attacks, unless there be some congenital malconformation, or unless idiotism be induced by convulsions, epilepsy, or some other previous and severe disease. The disease, however, often occurs in very young persons, and it is about the age of puberty, that its causes begin to operate most powerfully on youth. It is at this period characterized by its rapid progress and height of excitement; in adult age, it is more chronic.[*]

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* Hill, p. 101.

† Hill, p. 421.

‡ Parkman. Haslam on Madness, p. 80.

Dementia. This is often the consequence of mania or melancholy, and is somewhat allied to that decrepitude of mind, which frequently appears in old age. It may also originate from external injury or internal disease.

The understanding and memory are either totally, or to a very great extent, impaired in this form of disease; yet, on a few points, the latter seems sometimes to be in a perfect state. "Habit, however, has a great influence on their conduct, and gives it an appearance of regularity, which should not be mistaken for reasoning."[†] They hate, love, or fear, particular individuals uniformly, and kindness or attention will seldom, if ever, give them confidence in those they dislike.

Patients of this description are usually calm and quiet, though occasionally short periods of fury supervene. They sleep much, enjoy a good appetite, and are apt, if neglected, to become slovenly and dirty in their appearance. Esquirol mentions a case, which will give a general idea of this class in its usual form. The patient was a female, aged seventy, who, after having passed several years in a state of furious mania, at last fell into dementia. "The hallucination of this individual corresponds with her advanced age, and the long duration of the complaint. She preserves a few ideas, which still savour of pride. She believes herself the daughter of Louis XVI. but otherwise there is no coherence; no memory of recent transactions; no hopes or fears, desires or aversions. She is calm, peaceable; sleeps well, eats with voracity, and appears perfectly happy."[‡]

The ideas, although few and isolated, sometimes pass in rapid or alternate succession, and this gives rise to incessant babbling, unwearied declamation, and continual activity, without object or design. Occasionally, they assume a menacing air, without any real anger, and this is soon succeeded by immoderate laughter.[§]

The appearance is generally peculiar; the countenance is pale, the eyes are dull and moist, the pupils dilated, and the look is motionless and without expression. There is a variety as to emaciation or fatness. Some are extremely thin, while others are corpulent.

Idiotism. Individuals labouring under congenital idiotism, are marked by some striking characters. At its commencement, it is indicated both by feebleness of body and feebleness of mind. In some countries, this melancholy disease is not uncommon, and it has been particularly remarked in the Valais in Switzerland and in Carinthia. In the former countries, the subjects of it are styled Cretins. But wherever found, whether in individual instances, or originating in some national cause, the appearance may generally be described as follows:

The skull is smaller and inferior in height to the skull of maniacs, and there is a great disproportion between the face and head, the former being much larger than the latter. The countenance is vacant and destitute of meaning, the complexion sickly, the stature usually diminutive, the lips and eyelids coarse and prominent, the skin wrinkled and pendulous, and the muscles loose and flabby. To these are usually added, a complication of other diseases. The subjects are ricketty, scrophulous, or epileptic. The eyes are squinting or convulsive, and the hearing is imperfect or totally destroyed. Dr. Reeve visited the Valais, and saw several of these unhappy beings. One lad, twelve years old, could speak a few words, but was silly; and of a weak and feeble habit. Another boy, nine years old, was deaf, dumb, and idiotic. Neither of these however had goitres. A third, a girl, twelve years old, was deaf, dumb, and cross-eyed, and had a monstrous goitre, while a fourth had an enlarged abdomen, and some feeble traces of understanding.[*]

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[*] Medico-Chirurg. Rev. vol. 1, p. 251.

[†] Parkman.

[‡] Medico-Chirurg. Rev. vol. 1, p. 270.

[§] Foderé, Traité du Delire, vol. 1, p. 413.

While some are dumb, others express themselves in inarticulate sounds, cries, or a prolonged roar. A few are able to utter a word or two distinctly, as in the idiot mentioned by Esquirol. This was a female, aged twenty-one years, who had been in the Salpetriere three years, without any change. Her head was large and irregularly shaped, and the forehead high and prominent, so that the facial angle was more than ninety degrees. She eat voraciously and without discrimination; passed all evacuations involuntary, but the menses were regular and abundant. She walked little, and all her movements were convulsive,—she was a perfectly helpless infant, insensible to heat, cold, rain, or even her own internal feelings. She could only utter the words "*papa* and *mamma*," which she frequently repeated.[†]

Dr. Rush relates the case of a boy, born near Philadelphia, which is no less striking. He was twenty years old when that distinguished physician published his work, and was then unable to walk or speak. He had the head of a man, but all the parts below it resembled those of a child two or three years old. His pulse was from ninety to one hundred and twenty in a minute. He had shed his teeth, and now exhibited a third set, in three distinct rows in his upper jaw. And yet, with all this, he was unable to chew his food, and all that he took of a solid nature was first chewed for him by his sister. His ears were very large. When hungry or in pain, he cried, but more commonly laughed for hours, and even for whole nights together, and so loud as to disturb the sleep of his family. He discovers mind, says Dr. Rush, in but three things, viz. in an affection for his mother and sister, and in love for a dog, and for money. Distress is manifest when the dog is out of his place; and the pleasure which money gives him, is owing to the association he has been enabled to form between it and the means of procuring gingerbread, of which he is fond.[‡]

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[*] Edin. Med. and Surg. Jour. vol. 5, p. 82. See also Edin. Review, vol. 2, p. 170, Amer. edit.

[†] Medico-Chirug. Rev. vol. 1, p. 250.

[‡] Rush, p. 292. I will only refer to another case, and it is that mentioned by

With these statements I conclude the present section. I am far from flattering myself that I have collected all the varied symptoms that mental alienation induces, but I trust that the leading outlines have been developed with sufficient accuracy.

Besides the forms of insanity now described, there are others mentioned by systematic writers; as *demonomania*, which is a variety of melancholy, originating from mistaken ideas on religious subjects; and *nymphomania*, or *furor uterinus*, a raving mania of females, connected with a disorder of the generative organs. Other mitigated affections will be noticed hereafter.

A short sketch of the causes of insanity may be introduced in this place. They are usually divided into physical and moral, or bodily and mental; but a separation of this nature is not conducive to just views of the disease. Insanity is essentially a bodily disease, and the moral causes operate in producing it, as they do in producing other complaints.

We may enumerate the following as remote causes: repeated intoxication—injuries to the head—fever—suppressed discharges and secretions—excessive evacuations—mercury largely and injudiciously administered—paralytic affections—influence of particular seasons—hereditary predisposition—sedentary habits—excess in pleasure—factitious passions—mistaken views of religion—parturition—errors in education—intense application to a particular study or object of investigation—and misfortunes. On age, a remark has already been made; and it may be added as to sex, that upon a comprehensive comparison, there is found to be no other disproportion among the insane, than among the sane population in general.*

It should be remembered, that the insanity of females is always aggravated at the period of menstruation, particularly when it is in a morbid state.†

2. *Of feigned and concealed insanity.*

The medical witness is often required to decide on the actual existence of insanity, and it therefore behoves him to be well acquainted with its actual symptoms. It is in this point of view, that the enumeration given in the previous section becomes valuable. It will also materially aid in detecting feigned or concealed insanity.

There is no disease, says Zacchias, more easily feigned, or more difficult of detection, than the one under consideration. And hence, he remarks, many great men of ancient times, in order to elude the

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Mr. Hobhouse, which was seen by him at the hospital in Smyrna, in 1810. The individual was a female, about three feet and a half in height. She constantly sat, rolled up, as it were, upon a truss of straw—was quite dumb, nearly deaf, and possessed of no one consciousness of humanity. She would hop towards her keeper, on being loudly called by a name with which she was familiar. Her profile is given by Mr. Hobhouse, and it is strikingly characteristic of idiotism.—Travels in Albania, vol. 2, p. 626. London edit.

* Haslam on Madness, p. 208, 210. Medico-Chirurg. Rev. vol. 1. p. 251.

† Marc, in Godman's Western Reporter, vol. 2, p. 68.

danger that impended over them, have pretended it; as Ulysses, Solon, and Brutus the expeller of the Tarquins.*

In our day, however, madness is most commonly feigned for the purpose of escaping the punishment due to crime, and the responsibility of the medical examiner is consequently great. It is his duty, and should be his privilege, to spend several days in the examination of a lunatic, before he pronounces a decided opinion. If this be allowed to him, and also if he be enabled to obtain a complete history of the antecedent circumstances, much may be effected towards forming a correct opinion. The following remarks may serve as points on which the enquiry is to be grounded, and the comparison instituted.

1. It requires powers beyond the scope of ordinary exertion to counterfeit the character of an active paroxysm to its full extent. The deception is not maintained when the pretenders are alone and unwatched—the assumed malady then disappears, and the imposture is recommenced when they are in the society of others.†

2. A certain cast of countenance, and gestures accompanying it, are so peculiar in the insane, that a medical examiner, familiarized to them, will generally be able to designate the state that is present. Pretenders often outstrip madness itself, and seem desirous to exhibit themselves in its most violent and disgusting forms.

3. Real lunatics, at the periods of remission, are desirous of being deemed free from the malady, and often assiduously endeavour to conceal from observation those lapses of thought, memory, and expression, which are tending to betray them. Alexander Cruden, when suffering under his last attack of mental aberration, upon being asked whether he ever was mad, replied "I am as mad now as I was formerly, and as mad then as I am now; that is to say, *not mad at any time*."‡ The feigned never desire to conceal their condition.

4. Pretenders are unable to prevent sleep. That watchfulness which is so constant an attendant on the insane, is scarcely to be preserved for any length of time by those who are in actual health.

5. The physician should endeavor to obtain from the individual a history of himself. This requires attention and time, but the prosecution of the enquiry may lead to the developement of some probable motives for his present conduct.§

6. Mr. Hill also recommends attention to the presence or absence of the peculiar animal odour that is observed in maniacs. And "the best mode of making the discovery of it, is to enter the bed-room of the subject on his first awaking, after having slept in a small ill-ventilated room, in sheets and body-linen occupied by him for some time, the curtains now to be opened by the inspector. On inhaling the effluvia under these circumstances, it is scarcely possible to be mistaken."‖

7. Dr. Rush proposes a rule, grounded on the following circumstance: the pulse, according to his observation, is more frequent in

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* When his hand was in, he might have added King David to the list. 1 Samuel, xxi. 13.—EDITOR.

† Haslam's Med. Jurisprudence of Insanity, p. 322.

‡ Hill, p. 392.

§ Hill, p. 396.

‖ Ibid. p. 396.

all the grades of madness than in health. I have already intimated doubts on this point, and therefore can only recommend it as a test worthy of notice, but not of great value. He mentions the following case in which it was applied, and which deserves quotation. Two men were condemned to die in 1794, for treason, committed against the general government in the western counties of Pennsylvania. One of these was said to have become insane after sentence of death was pronounced on him. A physician was consulted upon his case, who declared the madness to be feigned. General Washington, the president of the United States, directed a consultation of physicians, and Drs. Shippen, Rush, and Samuel P. Griffiths, were appointed for that purpose. The man spoke coherently upon several subjects, and, for a while, the state of his mind appeared doubtful. Dr. Rush suggested the propriety of examining his pulse. It was more frequent, by twenty strokes in a minute, than in the healthy state of the body and mind. Dr. Shippen ascribed this to fear; but when the pulse of his companion was examined, although equally exposed to capital punishment, it was found perfectly natural, both in frequency and in force. This discovery induced the physicians to unite in a certificate, that the individual was really mad. He was respited, and subsequently pardoned.*

8. The administration of a strong solution of tartar emetic, unknown to the suspected person, has been advised. Where a common dose takes a full and powerful effect, deception may be suspected, as it is stated that such an effect never follows this administration in any stage of approaching or actual insanity; and more especially in the maniacal form, which is commonly attempted to be personated.†

9. It is very difficult uniformly to assume that extreme and sudden irritation, which, in real maniacs, instantly arises from any contradiction of their opinions or wishes.‡

10. The attempt to feign melancholy is much more difficult, according to Dr. Haslam, than to pretend mania. "They are deficient in the presiding principle, the ruling delusion, the unfounded aversions and causeless attachments which characterize insanity—they are unable to mimic the solemn dignity of characteristic madness, nor recur to those associations which mark this disorder; and they will want the peculiarity of look which so strongly impresses an experienced observer."§

11. In cases of doubtful idiocy, the fact should be noticed whether they are pusillanimous and submissive. This is a precept of Zacchias; but it must also be remembered, that impetuous excesses sometimes occur in individuals of this description. Their memory and conception should also be put to the test.‖

12. However skilful may be the attempt to counterfeit dementia,

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* Rush's Introductory Lectures. Lecture xvi. p. 369.

† Hill, p. 396. "Some melancholics, as well as maniacs, are very insensible to the action of drastic purgatives."—Marc, Godman's Western Reporter, vol 2. p. 67. See also Male, p. 257.

‡ Foderé, Traité du Délire, vol. 2, p. 500.

§ Halsam's Med. Jurisprudence of Insanity, p. 323.

‖ Marc, Godman's Western Reporter, vol. 2, p. 66.

and it is the most easily assumed of all the forms, yet there is always in the pretender a kind of hesitation and reflection to be observed in his discourse. His wild ideas do not succeed each other with the same rapidity as those of a person whose understanding has been really destroyed. Marc proposes, as another test, to repeat to the insane person a series of ideas recently uttered. The pretended madman, instead of wandering incoherently, would judge it most expedient to repeat the same words for the purpose of proving his madness.*

13. It may sometimes be proper, if suspicion exist, to speak of some severe remedy, or to threaten some punishment. The really insane do not heed these, being occupied with the phantasms of the imagination, and they are hence insensible to the operation of hope or fear. The feigned, on the other hand, will often discover, by words or actions, the emotion which the threat produces. Zacchias relates, that in his day, an able physician ordered, in the hearing of a suspected person, that he should be severely whipped. This was directed on the following grounds: if the patient be really insane, the whipping will produce an irritation on the external parts, and may tend to alleviate or remove the disease. If not, he cannot stand so severe a test. The event proved the success of this mode of reasoning, as the threat alone sufficed to cure the pretended malady.

On the same principle, the following case was detected by Foderè. A female, named Susannah Cloitre, was, in 1789, imprisoned, on the charge of having, in company with others, committed several highway robberies. Before this time, she had repeatedly, through her ingenuity in feigning insanity, escaped punishment from several tribunals in Savoy and Geneva. Foderè was ordered to examine her, and, on his first visit, she counterfeited the maniacal fit in so able a manner as almost to lead him to certify that she was insane. Recollecting, however, at the moment of departure, the case related by Zacchias, he returned to the door of the prison, and said, in a firm tone of voice, the following words: "To-morrow I shall again visit her, and if she continue to howl, if she be not dressed, and her chamber not put in order, you must apply a red-hot iron between her shoulders." The next day the chamber was found washed, the prisoners had slept quietly during the night, and the patient was dressed. Foderè continued his visits for some days, when he certified that she was not affected in her mind.†

Whether this investigation should be confided to medical men, or whether individuals generally are competent to it, is a question raised by some writers which I shall not discuss. In disputed cases, both of feigned and concealed insanity, it is very common for persons of every class in society, to come forward with their testimony, stating that the individual is or is not insane, while their depositions are often founded on transient conversations—on short and inattentive examinations, or on a slight notice of counterfeited or ordinary actions. That these are not calculated to determine the true state of mind, has, I hope, been already shewn. That they may lead to serious errors, will particularly appear, when we hereafter notice that form of insanity, in which the boundaries between it and sanity approach so near, that judges and juries often doubt whether the act is the result of madness or of wickedness.*

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* Marc, *ut antea*, p. 68.

† Foderè. Medicine Legale, vol. 2, p. 461.

This disease is observed to be *concealed*, in the hope of escaping the restraints of confinement. And the difficulty of detection is increased by the remarkable cunning and dissimulation of which some maniacs are capable. A few examples will illustrate this in a satisfactory manner.

"An Essex farmer, about the middle aged," says Haslam, "had on one occasion so completely masked his disorder, that I was induced to suppose him well, when he was quite otherwise. He had not been at home many hours, before his derangement was discernible by all those who came to congratulate him on the recovery of his reason. His impetuosity and mischievous disposition daily increasing, he was sent to a private mad-house; there being, at that time, no vacancy in the hospital. Almost from the moment of his confinement he became tranquil and orderly, but remonstrated on the injustice of his seclusion.

"Having once deceived me, he wished much that my opinion should be taken respecting the state of his intellects, and assured his friends that, he would submit to my determination. I had taken care to be well prepared for this interview, by obtaining an accurate account of the manner in which he had conducted himself. At this examination, he managed himself with admirable address. He spoke of the treatment he had received from the persons under whose care he was then placed, as most kind and fatherly: he also expressed himself as particularly fortunate in being under my care, and bestowed many handsome compliments on my skill in treating this disorder, and expatiated on my sagacity in perceiving the slightest tinges of insanity. When I wished him to explain certain parts of his conduct, and particularly some extravagant opinions, respecting certain persons and circumstances, he disclaimed all knowledge of such circumstances, and felt himself hurt, that my mind should have been poisoned so much to his prejudice. He displayed equal subtlety on three other occasions when I visited him; although, by protracting the conversation, he let fall sufficient to satisfy my mind that he was a madman. In a short time he was removed to the hospital, where he expressed great satisfaction in being under my inspection. The private madhouse, which he had formerly so much commended, now became the subject of severe animadversion; he said that he had there been treated with extreme cruelty; that he had been nearly starved, and eaten-up by vermin of various descriptions. On enquiring of some convalescent patients, I found (as I had suspected) that I was as much the subject of abuse, when absent, as any of his supposed enemies; although, to my face, his conduct was courteous and respectful. More than a month had elapsed, since his admission into the hospital, before he pressed me for my opinion; probably confiding in his address, and hoping to deceive me. At length he appealed to my decision, and urged the correctness of his conduct during confinement as an argument for his liberation. But when I informed him of circumstances he supposed me unacquainted with, and assured him, that he was a proper subject for the asylum which he then inhabited, he suddenly poured forth a torrent of abuse; talked in the most incoherent manner; insisted on the truth of what he had formerly denied; breathed vengeance against his family and friends, and became so outrageous that it was necessary to order him to be strictly confined. He continued in a state of unceasing fury for more than fifteen months."*

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* The best mode that has yet been discovered for forcing a man who feigns madness to confess and desist, is by the use of the whirling chair, that is, a chair placed upon a spindle, which revolves upon its own axis, and is turned by a wheel and crank, with the rapidity of the fly of a jack; it produces nausea even to syncope, and after two minutes of such discipline, few men can command spirits sufficient to act any part. It was by this means that Mc Dougal, of Glasgow, was rendered sane when he feigned madness, to avoid being tried for sinking ships, to defraud the underwriters—but he betrayed himself to the medical men by the common fault of impostors, not having "a method in his madness," but mixing up the two irreconcileable characters of

"The moping idiot, and the madman gay."—EDITOR.

Lord Erskine, in his celebrated speech for James Hadfield, mentions two cases which are striking and instructive. "I examined," says he, "for the greater part of a day, in this very place, (the Court of King's Bench,) an unfortunate gentleman who had indicted a most affectionate brother, together with the keeper of a mad-house at Hoxton, for having imprisoned him as a lunatic, whilst according to his own evidence, he was in his perfect senses. I was, unfortunately, not instructed in what his lunacy consisted, although my instructions left me no doubt of the fact; but not having the clue, he completely foiled me in every attempt to expose his infirmity. You may believe, that I left no means unemployed, which long experience dictated, but without the smallest effect. The day was wasted, and the prosecutor, by the most affecting history of unmerited suffering, appeared to the judge and jury, and to a humane English audience, as the victim of the most wanton oppression; at last Dr. Sims came into court, who had been prevented by business from an earlier attendance. From him I soon learned that the very man, whom I had been above an hour examining, and with every possible effort which counsel are so much in the habit of exerting, believed himself to be the *Lord and Saviour of mankind*, not merely *at the time of his confinement*, which was alone necessary for my defence, but *during the whole time he had been triumphing over every attempt to surprise him, in the concealment of his disease*. I then affected to lament the indecency of my ignorant examination—when he expressed his forgiveness, and said, with the utmost gravity and emphasis, in the face of the whole court, 'I AM THE CHRIST,' and so the cause ended."

The other statement he derived from lord Mansfield himself, who had tried the cause. "A man of the name of Wood had indicted Dr. Monro, for keeping him as a prisoner when he was sane. He underwent the most severe examination by the defendant's counsel, without exposing his complaint; but Dr. Battie having come upon the bench by me, and having desired me to ask him what was become of the PRINCESS, with whom he had corresponded in cherry-juice, he showed in a moment what he was. He answered, that there was nothing at all in that, because having been (as every body knew,) imprisoned in a high tower, and being debarred the use of ink, he had no other means of correspondence, but by writing his letters in cherry-juice, and throwing them into the river which surrounded the tower, where the Princess received them in a boat. There existed, of course, no tower, no imprisonment, no writing in cherry-juice, no river, no boat, but the whole was the inveterate phantom of a morbid imagination. I immediately," continued lord Mansfield, "directed Dr. Munro to be acquitted; but this man, Wood, being a merchant in Philpot-lane, and having been carried through the city, on his way to the mad-house, indicted Dr. Munro over again, for the trespass and imprisonment in London, knowing that he had lost his cause by speaking of the Princess at Westminster; and such," said lord Mansfield, "is the extraordinary subtlety and cunning of mad-men, that when he was cross-examined on the trial in London, as he had successfully been before, in order to expose his madness, all the ingenuity of the bar, and all the authority of the court, could not make him say a single syllable upon that topic which had put an end to the indictment before, although he had still the same indelible impression upon his mind, as he had signified to those who were near him: but, conscious that the delusion had occasioned his defeat at Westminster, he obstinately persisted in holding it back."[*]

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* Haslam on Madness, p. 53.

Some directions, as to the best method of detecting concealed insanity, may readily be drawn from the above narratives; but the subject is in itself a very difficult one. The medical witness, in these cases, has to decide—not whether a person is actually or feignedly insane for the first time in his life, but whether there is such a recovery from madness as to entitle him to the appellation of a sane man.

The nurses, attendants, and physicians, who have had the care of him, are the proper persons to testify concerning his state. Notwithstanding all the efforts, all the cunning and dissimulation which may be exercised, there are moments when the ruling malady breaks forth, and it will most readily be noticed by those who have previously watched him. And if his eye, at these moments, "meets that which has so often checked his vacillatory emotions—the instant of such a meeting is the instant of self-correction, of silence, or of sudden order and surprising self-possession."[†]

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[*] This evidence at Westminster was then proved against him by the short-hand-writer. Lord Eldon, since he has been lord-chancellor, has mentioned, from the bench, a case which occurred to him while at the bar, also illustrative of the difficulty that occurs in such cases. After repeated conferences, and much conversation with a lunatic, he was persuaded of the soundness of his understanding, and prevailed on lord Thurlow to supersede the commission. The lunatic, however, immediately afterwards calling on his counsel to thank him for his exertions, convinced him, in five minutes, that the worst thing that he could have done for his client, was to get rid of the commission.—Vesey, jun.'s Reports, vol. 11, p. 11. *Ex parte*, Holyland.

[†] Hill, p. 397. This circumstance may also be applied to the detection of feigned lunatics. "All such, upon seeing the person whom they know has been long accustomed to the management or cure of lunatics, become ten-fold more foolish, bois-

It must also be remembered, that those who are insane on particular subjects, will reason correctly on ordinary and trivial points, *provided they do not become associated with the prevailing notions which constitute their insanity.*[*] And this circumstance is very apt to become a source of error, since unobservant persons will be readily deceived by this temporary display of rational discourse, and form a hasty conclusion. Hence the importance of continued examination. At the commencement of an interview, it may be all calmness and apparent rationality—yet, when least expected, the disorder breaks forth, and, in many instances, there seems to be no cause for this conversion from apparent sanity to evident derangement. Even when placed in the society of other madmen, he is capable of detecting their folly and aberration from reason, and will endeavour to convince them of the absurdity of their prevailing opinions; "yet, in a moment, his mind launches into the regions of fiction, its admired clearness becomes obscured, and its seeming regularity exhibits a confused assemblage, or violent distortion. There is no intermediate condition which separates these states, and the transition very much resembles the last connected glimpses of our waking thoughts, followed by the abrupt creation of a dream."[†]

To conclude then on this point, the examiner must have sufficient time allowed him, and he should not be interrupted during it. The subtlety of the patient should be recollected, and his artful concealment of his real opinions. And these should not be directly commenced with, as subjects of discussion, since he would soon perceive the drift of the enquiries, and endeavour to evade, or pretend to disown, them. "The purpose is more effectually answered by leading him to the origin of his distemper, and tracing down the consecutive series of his actions and association of ideas. In going over the road where he has once stumbled, he will infallible trip again."[‡]

3. *Of the legal definition of a state of mental alienation, and the adjudications under it.*

The common law of England, on the subject before us, is thus expounded by Blackstone: "An *idiot*, or natural fool," says he, "is one that hath no understanding from his nativity, and therefore is by law presumed as never likely to obtain any." But a man is not an idiot, if he hath any glimmering of reason, so that he can tell his parents, his age, or the like common matters.[§] Over individuals of this description, the king is appointed guardian, and the lord-chancellor acts under his authority, as the conservator of their pro-

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terous, or unmanageable than before, in order to impress the minds of the beholders with awful ideas of their very alarming or pitiable state, but their detection and exposure is the sure result of diligent inquiry."

[*] Haslam's Med. Jurisprudence of Insanity, p. 296.

[†] Haslam's Med. Jurisprudence of Insanity, p. 296. [‡] Ibid. p. 331.

[§] Blackstone's Commentaries, vol. 1, p. 302, 304.

perty. He also is to provide for them, and at their death renders their estates to their heirs.

"A *lunatic*, or *non compos mentis*, is one who hath had understanding, but by disease, grief, or other accident, hath lost the use of his reason. A lunatic is indeed properly one that hath *lucid intervals;* sometimes enjoying his senses, and sometimes not, and *that frequently depending upon the change of the moon*. But, under the general name of *non compos mentis*, (which, Sir Edward Coke says, is the most legal name) are comprised not only lunatics, but persons under frenzies, or who lose their intellects by disease; those that *grow* deaf, dumb, and blind, not being *born* so; or such, in short, as are judged by the court of chancery incapable of conducting their own affairs."* Over such, the crown is also guardian, but in a different manner, as the law supposes that these accidental misfortunes may be removed, and therefore he or his special delegate, the lord-chancellor, acts only as a trustee, and preserves the property for the use of the insane person, until he be restored to reason.

The methods of proving a person an idiot, or *non compos*, are, in every important particular, alike. But, in the former, a writ is issued to inquire into the state of the person's mind, and the question of idiocy is tried before the escheator, or sheriff, by a jury of twelve men; while the latter has, of late years, been examined by a commission, in the nature of the writ de *idiota inquirendo*, and a jury is summoned by the persons appointed commissioners.† If the result of the commission be a return, that the individual is a lunatic, he is then committed to the care of tutors, or guardians, who are styled his *committee*.

Should the individual recover his state of sound mind, the chancellor must be petitioned to supersede the commission; and, on the hearing of this, the individual should attend, that he may be inspected in person; and it is also usual for the physician to attend, or to make an affidavit *that he is perfectly recovered*.‡

These are the leading principles of the English law concerning the insane in civil cases. I come now to notice those in force in criminal ones.

Insanity or idiotism excuses an individual from the guilt of crimes, and he is not chargeable for his own acts, if committed when under these incapacities. "And if a man, in his sound memory, commits a capital offence, and, before arraignment for it, he becomes mad, he shall not be tried; if after he be tried, and found guilty, he loses his senses before judgment, judgment shall not be pronounced; and if, after judgment, he becomes of nonsane memory, execution shall be stayed. If there be any doubt whether the person be *compos*, or not, this shall be tried by a jury. And if he be so found, a total idiocy, or absolute insanity, excuses from the guilt, and of course from the punishment of any criminal action committed under such deprivation

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* Blackstone, vol. 1, p. 304.

† Highmore on the Law of Idiocy and Lunacy, p. 20, 21. ‡ Ibid. p. 73.

of the senses: but, if a lunatic hath lucid intervals of understanding, he shall answer for what he does in those intervals, as if he had no deficiency."[*]

The law at present in force in the state of New-York, is similar in most particulars to that just noticed. The chancellor has the care, and provides for the safe-keeping of all idiots and lunatics, and of their real and personal estates, so that they and their families may be properly maintained. He is also empowered to dispose, and regulate their property under certain restrictions; and, should the lunatic recover, his property is to be restored; but should the idiot or lunatic die, it goes to his heirs or next of kin.[†]

Two or more justices are also allowed to cause to be apprehended and kept safely in custody, any persons who, by lunacy or otherwise, are furiously mad, or are so far disordered in their senses, that they may be dangerous to be permitted to go abroad. This provision does not, however, restrain or abridge the powers of the chancellor, or prevent any friend or relative of the lunatic's, from taking them under their own care and protection.[‡]

The mode pursued of proving a person a lunatic, or idiot, is to make an application to the chancellor, who appoints commissioners to enquire into the fact, and they summon a jury to try it, and by their verdict he is guided. He may, however, and has directed an issue to try the allegation of lunacy in the circuit court.[§]

On the petition of a lunatic to supersede the commission, it may either be referred to a master, to take proof thereon, and examine the lunatic, and to report the proofs and his opinion—or the lunatic is directed to attend in court, to be examined by the chancellor.[||]

In other states, where no separate equity jurisdiction exists, the examination and guardianship of these individuals is usually confided to high judicial tribunals, or to officers specially appointed for that purpose.

The common law of England is, however, generally the guide by which civil and criminal cases are decided in this country. It is the basis on which our statute laws are founded, and it is hence important that its peculiarities be distinctly understood.

The most striking of these is the distinction that exists between the law in civil and in criminal cases. If a lunatic be *perfectly recovered*, and not otherwise, his property is to be restored to him. But, in criminal cases, if he exhibit a *lucid interval* of understanding, he may be punished for acts committed during its presence, in the same manner as a sane person is punished. It will hence be proper to offer a few remarks on what is understood, by a lucid interval.

The term itself is, with great appearance of probability, supposed by Dr. Haslam to be connected with, and originate from, the ancient theory on the subject of *lunacy*. The patient became insane, as was supposed, at particular changes of the moon, and the inference was natural, that, in the intervening spaces of time, he would be rational.* This, however, is an opinion long since abandoned. Observers have repeatedly noticed, that the excess of the paroxysms has no connection with the phænomenon in question; and our author expressly states, that he kept an exact register for more than two years, but without finding, in any instance, that the aberrations of the human intellect corresponded with, or were influenced by, the vicissitudes of the moon. Esquirol states, that, in respect to lunar influence, he cannot confirm the long-prevalent opinion. The insane, he adds, are certainly more agitated about the full moon, but so are they about day-break every morning. Hence he conceives the *light* to be the cause of the increased excitement at both these periods. Light, he asserts, frightens some lunatics, pleases others, but agitates all.†

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[*] Blackstone, vol. 4, p. 24. [†] Revised Laws, vol. 1, p. 147.

[‡] Ibid. vol. 1, p. 116.

[§] See, in the matter of Wendell, a lunatic, Johnson's Chancery Reports, vol. 1, p. 600.

[||] In the matter of Hanks, a lunatic, ibid. vol. 3, p. 567.

If then the theory on which the term is founded, and the practical deduction from it, are both incorrect, what are we to understand by the term itself at the present day, in legal proceedings? I answer this by some quotations from the writings of distinguished advocates and enlightened physicians.

D'Aguesseau, one of the greatest names in French jurisprudence, thus defines it: "It must not be a superficial tranquillity, a shadow of repose, but, on the contrary, a profound tranquillity, a real repose; it must be, not a mere ray of reason, which only makes its absence more apparent when it is gone—not a flash of lightning, which pierces through the darkness only to render it more gloomy and dismal—not a glimmering which unites the night to the day; but a perfect light, a lively and continued lustre, a full and entire day, interposed between the two separate nights, of the fury which precedes and follows it; and to use another image, it is not a deceitful and faithless stillness which follows or forebodes a storm, but a sure and steadfast tranquillity for a time, a real calm, a perfect serenity; in fine, without looking for so many metaphors to represent our idea, it must be not a mere diminution, a remission of the complaint, but a kind of temporary cure, an intermission so clearly marked, as in every respect to resemble the restoration of health: so much for its *nature*.

"And as it is impossible to judge in a moment of the quality of an interval, it is requisite that there should be a sufficient length of time for giving a perfect assurance of the temporary re-establishment of reason, which it is not possible to define in general, and which depends upon the different kinds of fury; but it is certain there must be a time, and a considerable time: so much for its *duration*."‡

"To determine the existence of a lucid interval, in insanity," says Percival, "the testimony of a physician is sometimes required in courts of law. The complete remission of madness is only to be decided by reiterated and attentive observation. Every action, and even gesture of the patient, should be sedulously watched; and he should be drawn into conversations at different times, that may insensibly lead him to develope the false impressions under which he labours. He should also be employed occasionally in business, or offices connected with, or likely to renew his wrong associations. If these trials produce no recurrence of insanity, he may, with full assurance, be regarded as legally *compos mentis* during such period, even though he should relapse a short time afterwards into his former malady."*

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* Haslam on Madness, p. 214. † Medico-Chirurg. Review, vol. 1, p. 251.

‡ Highmore on the Law of Idiocy and Lunacy, p. 6.

"I should define," says Haslam, "a *lucid interval* to be a complete recovery of the patient's intellects, ascertained by repeated examinations of his conversation, and by constant observation of his conduct, for a time sufficient to enable the superintendent to form a correct judgment. If the person who is to examine the state of the patient's mind, be unacquainted with his peculiar opinions, he may be easily deceived, because, wanting this information, he will have no clue to direct his inquiries, and mad-men do not always, nor immediately, intrude their incoherent notions; they have sometimes such a high degree of control over their minds, that when they have any particular purpose to carry, they will affect to renounce those opinions which shall have been judged inconsistent; *and it is well known that they have often dissembled their resentment, until a favourable opportunity has occurred of gratifying their revenge.*"†

Lord Thurlow has also, with great clearness, stated *what should be the state present to constitute an actual lucid interval.* "By a perfect interval," says he, "I do not mean a cooler moment, an abatement of pain or violence, or of a higher state of torture—a mind relieved from excessive pressure; but an interval in which the mind, having thrown off the disease, had recovered its general habit."

"The burthen of proof," he adds, "attaches on the party alledging such lucid intervals, who must show sanity and competence at the period when the act was done, and to which the lucid interval refers; and it is certainly of equal importance that the evidence in support of the allegation of a lucid interval, after derangement at any period has been established, should be as strong and demonstrative of such fact, as where the object of the proof is to establish derangement. The evidence in such a case, applying to stated intervals, ought to go to the state and habit of the person, and not to the accidental interview of any individual, or to the degree of self-possession in any particular act."‡

Such then is the meaning of the term *lucid interval* in civil cases, but its signification is narrowed down in criminal ones. Lord Hale, with reference to these, makes a distinction between total and partial insanity; by the first, he understands a perfect form of the disease;

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* Percival's Medical Ethics, p. 214. † Haslam on Madness, p. 46 and 52.

‡ Brown's Chancery Cases, vol. 3, p. 443—444. The Attorney-General *v.* Parnther. Lord Eldon has, however, intimated his disagreement with Lord Thurlow's proposition. *Ex parte* Holyland, Vesey's Reports, vol. 11, p. 10. And in a late trial (July 20, 1822,) in chancery, he has still more openly avowed his opposition to it. The following are stated to have been his words: "With regard to what might

and, by the last, the presence of so much reason and understanding as will make the individual accountable for his actions. It is allowed by all commentators, "that the line which divides them is invisible, and cannot be defined; yet one or other of these states must be collected from the circumstances of each particular case, duly to be weighed by the judge and jury."* Sir Vicary Gibbs, when attorney-general of England, and trying Bellingham for the murder of the Hon. Spencer Percival, used the following language: "A man may be deranged in his mind—his intellects may be insufficient for enabling him to conduct the common affairs of life, such as disposing of his property, or judging of the claims which his respective relations have upon him; and if he be so, the administration of the country will take his affairs into their management, and appoint to him trustees; but, at the same time, such a man is not discharged from his responsibility for criminal acts. I say this upon the authority of the first sages in this country, and upon the authority of the established law in all

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be a lucid interval, it was a point of some difficulty. He could never go the length of Lord Thurlow in the case of Barker. (This is the case quoted above, Attorney-General *v.* Parnther.) That noble lord was of opinion, that if the existence of insanity was once established, the evidence of a lucid interval ought to be as clear as the evidence in support of the lunacy. He remembered putting the matter thus to Lord Thurlow; "I have seen you exercising the duties of lord-chancellor with ample sufficiency of mind and understanding, and with the greatest ability. Now, if Providence should afflict you with a fever, which should have the effect of taking away that sanity of mind for a considerable time, (for it does not signify whether it is the disease insanity, or a fever that makes you insane,) would any one say that it required such very strong evidence to show that your mind was restored to the power of performing such an act as making a will—an act, to the performance of which a person of ordinary intelligence is competent?" His lordship observed upon the case of Mr. Cogland; he was a person who lived in Prince's-street, Oxford-road, and a fire happening in his house, he was taken out of a two-pair of stairs window; it had such an effect upon him, that he became insane. He afterwards made his will, in a house kept by a person who had the care of lunatics. His will was precisely according to what he had previously told Mr. Winter, the bank solicitor, he had intended to make. He had stated to him what provisions he had made, and what he intended to make, and his will was in conformity with what he had so stated of his ideas of justice. The will was contested, on the ground that it was not made during a lucid interval; but the delegates were of opinion, that as it was a will affecting the very purposes he had before expressed, it was a good will—for these reasons, he could not agree in the doctrine of Lord Thurlow." *In the matter of Parkinson, a lunatic.* (Albion newspaper of the 7th of September, 1822, extracted from an English paper.) In the course of the pleadings, it was mentioned that Dr. Powell, an eminent physician in London, and for many years secretary to the commissioners for licensing mad-houses, held *there was no such thing as a lucid interval,* (in the ordinary acceptation of the term, I presume.) Dr. Powell probably holds the same opinion that Dr. Haslam does.

* Collinson on Lunacy, vol. 1, p. 475. In the case of Hadfield, who was tried, in 1800, for shooting at the King in Drury-lane theatre, it appeared that he was insane the day previous—that this insanity had been of some years standing, owing to an injury of the head; and Lord Kenyon held, that, as he was deranged immediately before the offence was committed, it was improbable that he had recovered his senses in the interim; *and although, were they to run into nicety, proof might be demanded of his insanity at the precise moment when the act was committed,* yet there being no reason for believing him to have been, at that period, a rational and accountable being, he ought to be acquitted; and the jury accordingly acquitted him.—Ibid. vol. 1, p. 488.

times, which law has never been questioned, that although a man be incapable of conducting his own affairs, he may still be answerable for his criminal acts, *if he possess a mind capable of distinguishing right from wrong*."*

Lord-chief-justice Mansfield, in his charge to the jury on the same trial, observed, "that there were various species of insanity. Some human beings were void of all power of reasoning from their birth: such could not be guilty of any crime. There was another species of madness, in which persons were subject to temporary paroxysms, in which they were guilty of acts of extravagance: this was called lunacy. If these persons were to commit a crime when they were not affected with the malady, they would be, to all intents and purposes, amenable to justice. So long as they could distinguish good from evil, so long would they be answerable for their conduct. *There was a third species of insanity*, in which the patient fancied the existence of injury, and sought an opportunity of gratifying revenge by some hostile act. If such a person were capable, in other respects, of distinguishing right from wrong, there was no excuse for any act of atrocity which he might commit under this description of derangement."†

By these principles, the criminal jurisprudence of England and this country has been guided, and decisions conformable to them have repeatedly been made.‡ They are doubtless correct, and conducive to the ends of justice; but it is to be feared, that cases may sometimes occur, in which the dividing line between sanity and insanity may be overleaped, in the ardour to punish a foul homicide. The form of insanity, which most commonly leads to the perpetration of this enormity, is one that assists in increasing the difficulty. It is that of melancholy, where the mind broods over a single idea, and that idea may be his own destruction, or the destruction of others.

But this subject is enveloped in insuperable difficulties. What can be more alike, than the anger of the sane and the insane? What a similitude between the maniac and the habitually passionate—between the melancholic, and him who habitually broods over his malignant and revengeful conceptions. In fine, if madness were not stamped on its front, would not the following be ranked among the foulest and most deliberate murders? It is taken from the mouth of the maniac himself, as stated to Dr. Haslam. "The man, whom I stabbed, richly deserved it: he behaved to me with great violence and cruelty; he degraded my nature as a human being; he tied me down, handcuffed me, and confined my hands much higher than my head, with a leathern thong; he stretched me on a bed of torture. After some days, he released me. I gave him warning, for I told his wife I would have justice of him. On her communicating this to him, he came to me in a furious passion, threw me down, dragged me through the court-yard, thumped me on my breast, and confined me in a dark and damp cell. Not liking this situation, I was induced to play the hypocrite. I pretended extreme sorrow for having threatened him, and, by an affectation of repentance, prevailed on him to release me. For several days I paid him great attention, and lent him every assistance. He seemed much pleased with the flattery, and became very friendly in his behaviour towards me. Going one day into the kitchen, where his wife was busied, I saw a knife; (this was too great a temptation to be resisted,) I concealed it, and carried it about me. For some time afterwards, the same friendly intercourse was maintained between us, but, as he was one day unlocking his garden-door, I seized the opportunity, and plunged the knife up to the hilt in his back."*

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* Collinson on Lunacy, vol. 1, p. 657. † Ibid. vol. 1, 672.

‡ As in the case of Earl Ferrers, who was tried before the House of Lords, in 1760, for the murder of Mr. Johnson, his steward. It was proved that his lordship was occasionally insane, and incapable, from his insanity, of knowing what he did, and of judging of the consequences of his actions. He had harboured enmity against Johnson for some time, but dissembled it, so that it was not suspected, or at least was supposed to have been forgotten. Johnson waited on him by appointment, and when alone in the room with the earl, the latter, with great deliberation, told him his time was come, and taking a pistol, inflicted the mortal wound. A verdict of guilty was found in this case, and the earl was executed. Hargrave's State Trials. vol. 10, p. 478.—So also, in the case of Edward Arnold, who was indicted for maliciously shooting at Lord Onslow. He had, for years, harboured an idea that Lord Onslow was an enemy to him, and in consequence had formed a regular steady design to murder him, and had prepared the proper means for carrying this into effect. And yet there was no doubt but that, to a certain extent, he was deranged. He also was found guilty; but, at Lord Onslow's request, he was reprieved, and confined in prison thirty years, till he died.—Collinson on Lunacy, vol. 1, p. 476.

I conclude these observations with a quotation from one of the most enlightened medical jurists in France. It deserves profound consideration:—"There is no species of madness," says Marc, "which so much deserves the attention of the physician and the jurist, as *mania without delirium*. It has brought to the scaffold many deplorable victims, who merited compassion rather than punishment. Unfortunately, I perceive no other means of ascertaining this wretched state, in which an instinct, at the same time destructive and irresistible, hurries on its victim to the commission of crimes the most abhorrent to nature, except a confinement indefinitely prolonged, during which he should be observed at those moments when he is excited by his dreadful propensity. Then, if it be real, an extreme agitation will be perceived, with flushings of the face, eyes sparkling, and perhaps also, as in cases of propensity to suicide, the most highly-wrought state of hypochondriac excitement. Women are in general more subject to this species of mania than men, especially at the periods of menstruation, (and particularly when in a morbid state,) or during gestation. These different situations, then, require great consideration. *Moreover, the moral circumstances which precede or accompany crimes, generally shew whether they are the result of criminal intentions or derangement of intellect; that is to say, that in a real criminal, there is always some motive of personal interest, by which the moral cause of his act may be known.* Thus, a homicide, followed by robbery, cannot be attributed to *mania without delirium*."†

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* Haslam on Madness, p. 169.

† Marc, in Godman's Western Reporter, vol. 2, p. 68.

4. *Of inferior degrees of diseased mind.*

There are several forms of disease, which, either in a partial or temporary manner, bear a strong resemblance to insanity. The diagnostic appearances of such deserve a brief notice, accompanied with a consideration of the question, how far the mental alienation may be presumed to extend in each.

The *delirium* of fever is one of the most striking, and in its general characters usually resembles mania. It is, however, distinguished by its antecedent or accompanying disease—the sensibility of the sight and hearing—turgescence and redness of the eye—tremor of the tongue—gnashing of the teeth, and heat of the skin. It is often preceded by watchfulness and anxiety, and by a change in conversation and conduct.

Suicide and murder are often committed by persons labouring under this affection, and their actions should be estimated like those of the furious maniac.

Hypochondriasis, on the other hand, has many points of similitude to melancholy. Those who are affected with it, are usually of a lax fibre, and engaged in sedentary occupations. There is a languor and want of resolution that accompanies all their undertakings, and a cast of sadness and timidity generally marks the countenance. As to all future events, says Cullen, in his graphic sketch of this disease, there is a constant apprehension of the worst or most unhappy state of them, and therefore there is often, upon slight grounds, an apprehension of great evil. "*Such persons are particularly attentive to the state of their own health—to every the smallest change of feeling in their bodies.*" He also remarks, that hypochondriases is always accompanied with dyspeptic symptoms, and, in elucidation of the diagnosis between it and melancholy, presents the following observations: "When an anxious fear and despondency arise from a mistaken judgment with respect to other circumstances than those of health, and more especially when the person is at the same time without any dyspeptic symptoms, every one will readily allow this to be a disease widely different from both dyspepsia and hypochondriasis." "As an exquisitely melancholic temperament may induce a torpor and slowness in the action of the stomach, so it generally produces some dyspeptic smyptoms; and from thence there may be some difficulty in distinguishing such a case from hypochondriasis. But I would maintain, however, that when the characters of the temperament are strongly marked, and more particularly when the false imagination turns upon other subjects than that of health, or when, though relative to the person's own body, it is of a groundless and absurd kind; then, notwithstanding the appearance of some dyspeptic symptoms, the case is still to be considered as that of a melancholy, rather than a hypochondriasis."*

Foderè mentions the following circumstances; as distinctive of these diseases: The habit of body—the illusion, as illustrated in the above quotation from Cullen, one being relative to physical subjects, and the other, to moral ones—the species of fear; that of the melancholic being reserved and prudent, and not destructive of his courage—while that of the hypochondriac renders him credulous, variable, and timid. He is in every respect selfish; while the melancholic, although labouring under the pressure of his disease, often retains noble sentiments.*

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* Cullen, quoted by Smith, p. 423, 424.

Hypochondriacs often talk of and sometimes attempt suicide, but rarely have courage enough to complete it.† They are generally aware of the nature of criminal acts, and should be judged accordingly. But it must be remembered, that this disease, as well as hysteria, when of long standing, or severe, often degenerate into insanity; and, indeed, are sometimes its first degree.

Hallucination. "An idea reproduced by the memory, associated and embodied by the imagination."‡ This state of mind is styled *illusion, or waking dreams,* by Dr. Rush; and it is strikingly illustrated in the remarkable story of Nicolai, of Berlin, who, for a length of time, was visited at his bedside by individual forms, that were visible to his sight, and addressed him. During all this period, however, he was conscious that it was a delusion.§ Had he believed in the existence of these phantoms, says Haslam, and acted from a conviction of their reality, he ought to have been deemed insane. A more familiar illustration is given by Collinson, and I presume there are many of my readers, who, at one time or another, have experienced a somewhat similar state of mind. "Ben Johnson, the celebrated dramatist, told a friend of his, that he had spent many a night in looking at his great toe, about which he had seen Turks and Tartars, Romans and Carthagenians, fight in his imagination."‖ If this had become permanent in his mind, he would have been deemed insane.

I can hardly imagine that this form of diseased mind can ever become a subject of legal investigation; but it may be remarked, that many maniacs have hallucinations, resembling those we have noticed. They are sometimes transient and confused, and, at other times, will grow permanent and fixed.¶

Epilepsy. I mention this, because it is a disease, that, when long continued or violent, is very apt to end in dementia. It gradually destroys the memory, and impairs the intellect. Epilepsy is also sometimes complicated with mania.

Its effects should hence be noticed from time to time, as they may become a subject of examination in civil cases.

Nostalgia. This is a well-known form of melancholy, originating in despair, from being separated from one's native country. I have already noticed its leading characteristics,** and will only add, that suicide is sometimes a consequence. Individuals labouring under it seldom, if ever, commit violence on others.

Intoxication. It is a well-known and salutary maxim in our laws, that crimes committed under the influence of intoxication, do not excuse the perpetrator from punishment. But it must also be recollected, that habitual drunkenness may induce a state of mind perfectly akin to insanity. It is, in fact, one of the common causes of that disease. The partition line between intoxication and insanity, may hence sometimes become a subject of discussion.

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* Foderè, Medicine Legale, vol. 1, p. 222. † Parkman. ‡ Ibid.

§ The narrative by Nicolai himself, is contained in Haslam's Med. Jurisprudence of Insanity, p. 308.

‖ Collinson on Lunacy, vol. 1. p. 34. ¶ Parkman. ** Vol. 1, p. 22.

William Mc Donough was indicted and tried for the murder of his wife, before the supreme court of the state of Massachusetts, in November, 1817. It appeared in testimony, that several years previous he had received a severe injury of the head; that, although relieved of this, yet its effects were such as occasionally to render him insane. At these periods he complained greatly of his head. The use of spirituous liquors immediately induced a return of the paroxysms, and, in one of them thus induced, he murdered his wife. He was, with great propriety, found guilty.* The *voluntary* use of a stimulus which he was well aware would disorder his mind, fully placed him under the purview of the law.

"In Rydgeway *v.* Darwin, Lord Eldon cites a case, where a commission of lunacy was supported against a person, who, when sober, was a very sensible man; but being in a constant state of intoxication, he was incapable of managing his property."†

In the state of New-York we have a statute which places the property of habitual drunkards under the care of the chancellor, in the same manner as that of lunatics. The overseers of the poor in each town may, when they discover any person to be an habitual drunkard, apply to the chancellor for the exercise of his power and jurisdiction. And in certain cases, when the person considers himself aggrieved, it may be investigated by six freeholders, whether he is actually what he is described to be; and their declaration is *prima facie* evidence of the fact.‡

The conduct of individuals of this class should be particularly noticed during the intervals of temperance, if any such exist. If spirituous liquors exercise such an influence as to render us doubtful concerning the state of mind at this time, we may reasonably infer that the alienation is becoming permanent.

Old age. It appears now to be decided, that debility of mind, in consequence of old age, may render a person unfit to manage his own affairs; and his property may be placed in the hands of a committee, in the same manner as that of a lunatic.§

A case was decided on this principle, in the chancery-court of this state, some years since. An individual, eighty-five years old, was seised of a large real estate, and it was alleged, from repeated acts, that his imbecility of mind, (although not a lunatic) and his want of understanding, were such as to render him incapable of managing his affairs. The chancellor awarded a commission, in the nature of a writ of lunacy, to enquire whether the facts were accordant to the above statement; and he also directed that the individual should be present, so that the jury might have the inspection of him. The inquisition was taken and returned, finding that J. B. was, and for one year preceding had been, of unsound mind, and mentally incapable of managing his affairs. A committee of the estate was accordingly appointed.*

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* Trial of William Mc Donough for the murder of his wife, &c. Second edition. Boston.

† Collinson on Lunacy, vol. 1, p. 71.

‡ Act passed March 16, 1821. There are other provisions in this act, (which however it is not necessary to quote here,) relating to the local powers of overseers in such cases.

By the Roman law, a notorious spendthrift was put under guardianship; and, by the law of Scotland, a man who, from drunkenness, facility of temper, or any other cause, is liable to be stripped of his property by the necessitous, or designing, has the power of putting *himself* under trustees, without whose sanction no act of his can be valid.—This is technically termed *inhibiting oneself.*—EDITOR.

§ Collinson on Lunacy, vol. 1, p. 66.

It is impossible to extend this investigation into the numerous cases, which may present doubts as to the strength of mind of individuals. Every instance must be judged on its own merits; and, while weakness of understanding deserves protection, it should be remembered that too nice an investigation of eccentricities and imperfections may lead to oppression and injustice.†

5. *Of the state of mind necessary to constitute a valid will.*

Sir William Blackstone, in his introductory remarks on the study of the law, observes, that were the medical profession to inform themselves on the doctrine of last wills and testaments, or at least so far as relates to the formal part of their execution, they might often use this knowledge with advantage to families, upon sudden emergencies.‡ Having such an authority, it will not, I trust, be deemed presumptuous if I preface the consideration of the present subject with a brief sketch of the legal requisites for making these.

It must be noticed, in the first place, that the law makes an important distinction between the disposition of personal and of real property. This is borrowed from the English law, but it is transferred into our own statutes.

Nuncupative wills. By this term is understood a verbal disposition of a person's property; and it is enacted, that none shall be good, where the estate thereby bequeathed shall exceed the value of seventy-five dollars, unless the same be proved, by the oath of three witnesses at least, who were present at the making thereof; nor unless it be proved that the testator, at the time of pronouncing the same, did bid the persons present, or some of them, bear witness, that such was his will, or words to that effect—nor unless such nuncupative will be made at the time of the last sickness of the deceased, and in his dwelling-house, or where he had been resident for ten days or more, next before the making of such will, except such person was surprised or taken sick, being from home, and died before his return to the same. It is further ordained, that after six months from the speaking of the pretended testamentary words, no testimony shall be received, to prove any nuncupative will, except the said testimony, or the substance thereof, was committed to writing within six days after the making of the said will; and also, that no letters, testamentary or probate, of any nuncupative will, shall pass the seal of any court until fourteen days, at the least, after the death of the testator shall be fully expired; nor shall any nuncupative will at any time be received to be proved, unless process hath first issued, to call in the widow or next of kin to the deceased, to the end that they may contest the same if they please.*

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* Johnson's Chancery Reports, vol. 2, p. 232. In the matter of James Barker.

† In the case of Lord Donegal, it was found that he was of weak understanding, although he gave rational answers about his estate, but *not to any questions about figures, as to which he could not answer the most common.* Lord Chancellor Hardwicke did not think that a sufficient foundation to grant a commission.—Vesey, senior's, Reports, vol. 2, p. 407.

‡ Blackstone's Commentaries, vol. 1, p. 13.

A nuncupative will has also been decided to be not good, unless it be made when the testator is *in extremis,* or overtaken by sudden and violent sickness, and has not time to make a written will. The words, "last sickness," in the statute just quoted, are understood to mean the last extremity.†

Secondly, a person may, by a will in writing, give and bequeath his personal property as he pleases; and nothing further is necessary to legalize it, except his hand-writing.

Lastly. Testaments, by virtue of which real property is devised, must be in writing, and signed by the party making the same, or by some other person in his presence, or by his express direction; and they shall be attested and subscribed in the presence of such party, by three or more credible witnesses, else such last will and testament shall be utterly void.‡

We may now add, that none of these are valid in law, if made by any infant, idiot, or person of insane memory. Here is the point at which the subject enters into legal medicine; and, under this law, it happens that the testimony of a physician is often required.

In law, a person is considered an infant until he arrives at the age of twenty-one; and the construction of this is, that if he is born on the first day of January, he is of age to do any legal act on the morning of the last day of December. Infants, according to the ecclesiastical or civil law, if above the age of fourteen, may, however, bequeath personal property, but no real estate. This respects males, as females may make a will of personal estate at twelve.

"Mad-men, or otherwise *non-compotes,* ideots, or natural fools, persons grown childish by reason of old age or distemper, such as have their senses besotted by drunkenness—all these are incapable, by reason of mental disability, to make any will so long as such disability lasts."§

Among the diseases which incapacitate an individual from making a valid will, or at least render his rationality doubtful, may be enumerated the following: lethargic and comatose affections, whether arising from some internal affection, or from external injury. These suspend the action of the intellectual faculties—so also does an attack of apoplexy; and even if patients recover from its first effects, an imbecility of mind is often left, which unfits an individual for the duty in question. Phrenitis, delirium tremens, and those inflammations which are accompanied with delirium, also impair the mind. Finally, in typhoid fevers, the low state which usually precedes death, is one that may be considered as incapacitating the individual.

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* Revised Laws, State of New-York, vol. 1, p. 367.

† Johnson's Reports, vol. 20, p. 502. Prince *v.* Hazleton. In this case the supposed nuncupative will was made several days before the death of the testator, and it did not appear that he had an idea of his dissolution being so near.

‡ Revised Laws, vol. 1, p. 364, 367.

§ Blackstone, vol. 2, p. 497.

On the other hand, there are many fatal diseases, in which the patient preserves his mind to the last, and all dispositions of property made by him are of course valid. Of these, none is more striking, than the clearness of intellect which sometimes attends the last stages of phthisis pulmonalis.

The symptoms—the state of the individual, his conversation and actions, should all be canvassed, and from them an opinion must be formed.*

It has been sometimes agitated, whether the loss of memory solely is such a proof of mental imbecility as to render a will invalid. On this point, the remarks of Chancellor Kent, in a case before him, are decisive. "The failure of memory is not sufficient to create the incapacity, unless it be quite total, or extend to his immediate family. The Roman law," he remarks, "seemed to apply the incapacity only to an extreme failure of memory, as for a man to forget his own name, *fatuus præsumitur qui in proprio nomine errat.* The want of recollection of names is one of the earliest symptoms of a decay of the memory, but this failure may exist to a very great degree, and yet the solid power of the understanding remain."†

As to the mode of proving whether an individual is competent to make a will, this of course must be according to the ordinary rules of evidence. A testator is always deemed sane until the contrary is proved; and the *onus probandi,* as to his mental incapacity, lies on the party who alleges his insanity. But if a mental derangement has been proved, it is then incumbent on the devisee to show a lucid interval, or the sanity of the testator at the time of executing the will.‡

An extraordinary case was tried in 1762, in the King's Bench in England, where the three surviving witnesses to the testator's will, and the two surviving ones to a codicil made four years subsequent to the will, and a dozen servants of the testator, all unanimously swore him to be utterly incapable of making a will, or transacting any other business, at the time of making the supposed will and codicil, or at any intermediate time. To encounter this evidence, the counsel for the plaintiff examined several of the nobility and principal gentry of the county of Worcester, who frequently and familiarly conversed with the testator during that whole period, and some on the day whereon the will was made, and also two eminent physicians, who occasionally attended him, and who all strongly deposed to the entire sanity and more than ordinary vigour of the testator. Other testimony, corroborative of this, was adduced; the validity of the will was established; and, subsequently, several of the defendant's witnesses were tried and convicted of perjury.§

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* Foderé, Medicine Legale, vol. 1, p. 261.

† Johnson's Chancery Reports, vol. 5, p. 161. Van Alst *v.* Hunter.

‡ Johnson's Reports, vol. 5, p. 144. Jackson ex dem Van Duzen and others *v.* Van Duzen.

§ Sir Wm. Blackstone's Reports, vol. 1. p. 365. Lowe *v.* Joliffe.

6. *Of the deaf and dumb—their capacity, and the morality of their actions.*

On this subject, little can be found in our jurisprudence; but the general rule deducible from adjudications, both in civil and criminal cases, is, that they must be judged of according to the intelligence and knowledge they are known to possess. A deaf and dumb person, educated at the present day under Sicard or Braidwood, or in one of the establishments of our own country, may certainly be deemed to understand the morality of actions much better than one who has never had that advantage, and he accordingly would more readily be put in possession of his civil rights, or be punished for any offence against the laws.*

A person born deaf and dumb is competent as a witness, provided he evinces sufficient understanding. This was decided in the following case:

At the Old Bailey January sessions, in 1786, on the trial of William Bartlett for simple grand larceny, John Ruston, a man deaf and dumb from his birth, was produced as a witness on the part of the crown. Martha Ruston, his sister, being examined on the *voir dire*, it appeared that she and her brother had been, for a series of years, enabled to understand each other by means of certain arbitrary signs and motions, which time and necessity had invented between them. She acknowledged that these signs and motions were not significant of letters, syllables, words, or sentences; but were expressive of general propositions and entire conceptions of the mind, and the subjects of their conversation had in general been confined to the domestic concerns and familiar occurrences of life. She believed, however, that her brother had a perfect knowledge of the tenets of Christianity, and was certain that she could communicate to him true notions of the moral and religious nature of an oath, and of the temporal dangers of perjury.

It was objected by the prisoner's counsel, that although these modes of conveying intelligence might be capable of impressing the mind with some simple ideas of the existence of a God, and of a future state of rewards and punishments, yet they were utterly incapable of communicating any perfect notions of the vast and complicated system of the Christian religion, and thence the witness could not with propriety be sworn upon the holy gospels. The difficulty of arraigning a man for perjury, whom the law presumes to be an idiot, and who is consequently incapable of being instructed in the nature of the proceedings against him, was also urged against the admissibility of the witness.

But the court overruled the objection, and John Ruston was sworn to depose "the truth;" and Martha Ruston, "well and truly to interpret to John Ruston, a witness here produced in behalf of the king against William Bartlett, now a prisoner at the bar, the questions and demands made by the court to the said John Ruston, and his answers made to them." The prisoner was found guilty, and received sentence of transportation for seven years.*

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* "A person born *deaf, dumb*, and *blind*, is looked upon by the law as in the same state with an idiot, he being supposed incapable of any understanding, as wanting all those senses which furnish the human mind with ideas." But if he *grow* deaf, dumb, and blind, not being *born* so, he is deemed *non compos mentis*, and the same rule applies to him, as to other persons supposed to be lunatics.—Blackstone, vol. 1, p. 304.

The deaf and dumb are also allowed to obtain possession of their real estate, if they show sufficient understanding. A female so situated, on attaining the age of twenty-one, applied to Lord Hardwicke (1754) for this purpose. Having put questions to the party in writing, and she having given sensible answers thereto in writing, the same was ordered.†

As to criminal cases, the following may be cited: A deaf and dumb person was indicted for larceny in Massachusetts, and being set to the bar for his arraignment, the solicitor-general suggested to the court that he was deaf and dumb, but that the evidence would prove him of sufficient capacity to be a proper subject for a criminal prosecution, and that he had formerly been convicted of larceny; and he moved that one *Nelson*, then in court, and an acquaintance of the prisoner, should be sworn to interpret the indictment to him, as it should be read by the clerk. The indictment was accordingly read by a sentence at a time, and Nelson, having been sworn, explained its purport to him, making signs with his fingers. After which, the court ordered the trial to proceed, as on a plea of not guilty.‡

A very curious case came before the court of justiciary in Scotland, on the 1st of July, 1807. The prisoner, Jean Campbell, alias Bruce, was charged with murdering her child, by throwing it over the old bridge of Glasgow. Mr. M'Neil, her counsel, stated an objection against her going to trial, on the ground of her being deaf and dumb from her infancy, and that he was totally unable to get any information from her to conduct her defence.

Mr. Drummond, counsel for the crown, now gave in a minute, stating, that he was satisfied of the prisoner's being deaf and dumb from her infancy, but he offered to prove that she was capable of distinguishing betwixt right and wrong, and was sensible that punishment followed the commission of crime.

He then called the following witnesses:—

Thos. Sibbald, keeper of the gaol. Prisoner has been two months in the gaol of Edinburgh; conducted herself rationally; made signs to the turnkey of a certain description when she wanted any thing, and when the articles were brought her she seemed satisfied; he has also seen her make signs to himself, as if taking something out of her breast and counting it with her hands; and that when she came first into prison, she clasped her hands together and made a sign as if something had fallen from her back, and seemed to indicate distress of mind; that he has seen her weep while in prison; and upon certain kinds of food having been brought to her, he has observed her express herself as if satisfied; and when she was weeping, as before mentioned, she made the same signals as if something had fallen from her back.

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* Phillips' Law of Evidence, p. 14. Lawyer's Magazine, vol. 2, p. 310. I am informed, that a case precisely similar occurred some years since in Connecticut.

† Dickenson *v.* Blisset—1 Dickens' Reports, p. 268. See also on this subject generally, Johnson's Chancery Reports, vol. 4, p. 441—Brower *v.* Fisher.

‡ Massachusett's Reports, vol. 14, p. 207.—Commonwealth *v.* Timothy Hill.

Robert Kinniburgh, teacher of the Deaf and Dumb Institution, deposed, that he had seen the prisoner once in the gaol at Glasgow, and repeatedly in the gaol of Edinburgh; that he has had communication with her by means of signs; in general he understood her, but in particular instances he did not; that she, by her signs, communicated to him the circumstances which took place relative to her child; that the death of her child was altogether accidental, and that when it happened, she was intoxicated; that she communicated to him, that upon that occasion the child was upon her back, covered with her petticoat and duffle cloak: and, as he understood her, she had held them together upon her breast with her hand, while she rested the child upon the parapet of the bridge, over which the child fell while she was in the act of putting her hand in her breast, where she had money, and which she was afraid was lost, and, by so putting her hand in her breast, he understood she had lost hold of her child, at which time the child was asleep, and had then fallen over the bridge. She communicated to the witness, that, before the act, she had that day drank eight glasses of spirits. That his communications with the prisoner chiefly turned upon the accident, and that she seemed to understand him about as much as he understood her; that is, in general, but upon some particular occasions she did not; that she can make the initial letters of her name, but inverts them, C. J.; and when she does so, points to herself, which leads him to think she understands them; that she makes two or three other letters, but is not sure if they denote her children or not. He understood from her that she had three children, and that the one the accident happened to was one of them; that he rather suspected she was not married, as the children were to different individuals; that as far as the communications could take place betwixt him and the prisoner, she is a woman of strong powers of mind; that nothing appears to have been wanting, humanly speaking, to have saved her from the pitch of depravity she appears to have attained, but some hand to have opened for her the treasures of knowledge in proper time; that he conceives that the prisoner must be possessed of the power of conscience in a certain degree, and that she seems a woman of strong natural affection towards her children, as he was informed by persons at Glasgow; and which she manifested by the indignant denial of the charges of having wilfully killed her child, and her immediate assertion that it lost its life by accident; as well as from observations he has made as to the state of mind of other uneducated deaf and dumb persons; and particularly in one instance, in the report of the Institution for 1815, page 54, he is of opinion, that if not blunted by intoxication, these feelings must have convinced her of the criminality of bereaving her child of life. That in his communications with the prisoner, he was satisfied she was sensible of the criminality of theft, but he cannot say any thing as to the abstract crime of murder in general. That she communicated to the witness her indignation at the fathers of her children for the way they had used her, and one of whom she has sometimes represented as her husband. That sometimes he could not understand whether she understood the ceremony of marriage or not, or sometimes wished to evade the questions, or did not understand them; that he has seen her use the form of a ring as a token of marriage; and she made signs that that had been taken away by the man she called her husband; that is to say, that the marriage had been dissolved by him, and he had taken another wife. That from what he saw of her at Glasgow, as well as what he observed in the gaol of Edinburgh, he is convinced she was aware that she was to be brought at Glasgow before a court of justice, and that he was confirmed in this from his having a conversation with a woman there, who seemed to understand her signs perfectly well in general; and who mentioned to him, that she had made signs to her with regard to the dress of the judges; that he understood that she connected the death of her child with her appearance in court. (Being interrogated by the court whether he is of opinion that the prisoner could be made to understand the question, whether she is guilty or not guilty of the crime of which she is accused?) Answers—that from the way in which he would put it, by asking her by signs, whether she threw her child over the bridge or not? he thinks she could plead not guilty by signs, as she has always communicated to him, and this is the only way in which he can so put the question to her; but he has no idea, abstractedly speaking, that she knows what a trial is, but that she knows she is brought into court about her child. That she has no idea of religion, although he has seen her point as if to a Supreme Being above; and communicates merely by natural signs, but not upon any system; that he could not obtain from her information where her supposed husband is, or what was his name; neither could she communicate by natural signs any particular place, unless he had been at that place with her before, or had some mark for it; and that she could not communicate to him about any person unless there was some sign by which he could bring that individual to her recollection, or had been seen together in certain circumstances; that in referring to the accident, the prisoner communicates that there was a baker's boy near who heard the child plunge into the water and gave the alarm, and that upon this she laid her hands upon the ears of her little boy near her, but for what purpose he cannot say, unless to prevent her from crying out.

Here the court expressed a wish to see Mr. Kinniburgh put the question to the witness in open court, and she answered by signs in the same manner as he had described.

The Lord Justice Clerk thanked Mr. Kinniburgh for his attention, and the assistance the court had derived from his professional skill.

Dr. William Farquharson stated, that he twice visited the prisoner in the gaol of Edinburgh; on the first occasion alone, and on the second, along with Mr. Kinniburgh and another gentleman: that she fully satisfied him that she was not feigning to be deaf and dumb: and that when he first saw her, she did not seem to understand his signs so well as after being visited by Mr. Kinniburgh; and the witness made that observation to Mr. Kinniburgh himself: that he had communications the first time with her as to the loss of her child, and used signs in regard to a child then in prison, as if throwing it away; upon which she made the same signs as to the accident, as she has now done to Mr. Kinniburgh in presence of the court: that she appeared to the witness to know as little of the distinction between right and wrong, as a child of six months old; and that she did not appear to be conscious of having done any thing wrong whatever in regard to the child: that, in giving the above opinion, he has formed it from the facts of the prisoner having been both deaf and dumb, and having received no education whatever.

John Wood, Esq. auditor of excise, [who is deaf and partially dumb,] gave in a written statement upon oath, mentioning, that he had visited the prisoner in prison, and was of opinion that she was altogether incapable of pleading guilty or not guilty; that she stated the circumstances by signs, in the same manner she had done to the court, and seemed to be sensible that punishment would follow the commission of a crime.

The court were unanimously of opinion, that this novel and important question, of which no precedent appeared in the law of this country, deserved grave consideration, and every information the counsel on each side could procure and furnish.

The court then ordered informations on each side to be prepared and printed.

At a subsequent period, the judges delivered their opinion as follows:

"Lord Hermand was of opinion, that the panel [prisoner] was not a fit object of trial. She was deaf and dumb from her infancy—had had no instruction whatever—was unable to give information to her counsel—to communicate the names of her exculpatory witnesses, if she had any, and was unable to plead to the indictment in any way whatever, except by certain signs, which he considered, in point of law, to be no pleading whatever.

"Lords Justice Clerk, Gillies, Pitmilly and Reston, were of a different opinion. From the evidence of Mr. Kinniburgh and Mr. Wood, they were of opinion that the panel was *doli capax quoad* the actual crime she was charged with. It was true that this was a new case in Scotland, but in England a case of a similar nature had occurred. One Jones was arraigned at the Old Bailey, in 1773, for stealing five guineas. He appeared to be deaf and dumb; a jury was impanelled to try whether he wilfully stood mute, or from the visitation of God: they returned a verdict, 'from the visitation of God'—and it having appeared that the prisoner had been in the use of holding conversation by means of signs, with a woman by the name of Fanny Lazarus, she was sworn an interpreter. He was tried, convicted, and transported. In the present case, the panel had described to Mr. Kinniburgh most minutely the manner in which the accident had happened to her child; and from the indignant way in which she rejected the assertion that she had thrown it over the bridge, it was evident she was sensible that to murder it was a crime. It was also observed by Lord Reston, that it would be an act of justice towards the panel herself, to bring her to trial; for, if the court found she was a perfect *non-entity*, and could not be tried for a crime, it followed, as a natural consequence, that the unhappy woman would be confined for life; whereas, if she was brought to trial, and it turned out that the accident occurred in the way she described it, she would immediately be set at liberty. The court found her a fit object for trial."*

There are several points connected with the subject of mental alienation, which properly belong to MEDICAL POLICE. Of this nature are the general causes, and the possibility of their removal—the treatment the insane should receive, and the care that the government should bestow on their safe-keeping.†

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* The first part of this case I have taken from an English newspaper; and the opinion of the judges, from Smith's Forensic Medicine, p. 430.

The sequel of this is worthy of record.—The woman was brought to the bar, and the indictment read in the usual form; the question was then put, guilty or not? Mr. M'Neill, the counsel for the prisoner, then rose, and stated, that he could not allow his client to plead to the indictment, until it was explained to her that she was at liberty to plead guilty or not; upon it being found that this could not be done, the case was dropt, and she dismissed from the bar *simpliciter*. Thus, though it is established in Scotland, that a deaf mute is *doli copax*, no means have yet been discovered of bringing him to trial.

Another interesting discussion took place last winter in the high court of Justiciary, as to whether or not a deaf mute was capable of giving evidence. A rape had been committed on a deaf and dumb girl, and her evidence was objected to by the counsel for the prisoner, who argued, that though it were admitted to the fullest extent that she had a perfect idea of the existence of a supreme being, and a future state, and though she might be perfectly convinced of the obligation under which she lay to speak the truth—yet every one had as perfect a knowledge at least, of these facts and obligations as she could possibly have, yet their testimony went for nothing, unless confirmed by an oath; and as it was obvious that she could not give an oath, her testimony must go for nothing. The court, however, overruled the objection.—EDITOR.

† It will be observed that I have not noticed the subject of suicide in this chapter. Whether this is or is not a proof of insanity, is a question which fortunately never comes before our coroner's juries. We do not war on the dead body in this country.

CHAPTER XIII.

PERSONS FOUND DEAD.

Duties of the office of coroner. Sketch of the causes which may produce sudden death, independent of murder—(*a*) internal disease—(*b*) an external, accidental cause—noxious gases—cold and hunger—lightning—(*c*) suicide. Importance of dissection in all suspected cases. 1. Directions for performing medico-legal dissection—examination of the head, spine, thorax, and abdomen. Distinction between natural appearances and the effects of violence—hæmorrhage—ecchymosis—congestions of blood—inflammation. The degree of putrefaction compatible with dissection. 2. Of PERSONS FOUND DEAD FROM NOXIOUS INHALATIONS. (*a*) Carbonic acid gas—modes in which it may be generated—symptoms—appearances on dissection. (*b*) Sulphuretted hydrogen gas—symptoms—appearances on dissection. 3. Of PERSONS FOUND HUNG. Modes in which death occurs from hanging—appearances on dissection. Whether the person found hung has been suspended before or after death—Whether the hanging is the result of suicide or homicide. Cases. 4. Of PERSONS FOUND STRANGLED. Whether this has been actually the cause of death. Cases. Appearances on dissection. Whether strangulation is possible as an act of suicide. 5. Of PERSONS FOUND DROWNED. Examination of the signs which distinguish death by submersion, from death previous to submersion. Estimate of the value of each. Cases. Whether the drowning was the effect of accident, suicide, or homicide. 6. Of PERSONS FOUND SMOTHERED. 7. Of PERSONS FOUND DEAD FROM WOUNDS. Whether the wounds are the result of accident, suicide, or homicide. Cases. 8. Of PERSONS FOUND BURNT TO DEATH. Spontaneous combustion—cases of this. 9. Of PERSONS FOUND DEAD FROM HUNGER. Appearances on dissection.

DEATH, even when it is the consequence of disease, is often an unexpected event. But if an individual expire under his own roof, surrounded by friends and relatives, we are disposed to consider it as an ordinary dispensation of Providence, and one to which all of us are sooner or later doomed. The features of the case differ materially, when a person is found dead on the highway, on the banks of a river, or in a lonely place. Indeed, if he be discovered to have paid the last debt of mortality, either in a sudden manner, or at a distance from his home, the laws of civilized society demand an investigation of the cause; and over this investigation, the officer, called a coroner, is appointed to preside.*

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* In Scotland, no such office as that of coroner exists, nor is there a jury to decide on the subject; but when a body is found dead, the sheriff-substitute, (a lawyer by profession,) or, in his absence, the procurator-fiscal makes a thorough investigation into the cause of death, and examines all witnesses, medical and others, who can be supposed to throw light upon the subject. This examination is generally a private one, and all the testimony is minutely taken down in writing, and forwarded to the lord-advocate's department; and if suspicion seems to rest on any individual, he

It will readily be observed, from the above remarks, that the office in question is an important one. The duty of the coroner extends to an examination of the circumstances connected with every case of sudden or suspicious death, and he is to make this with the aid of a jury, summoned by him for the purpose. Future proceedings are regulated by the verdict that they may pronounce.

"In many instances, the evidence of medical men is required. Sometimes, indeed, the facts are so clear, that no professional opinion can be wanted, *but whenever there is the least uncertainty*, such opinions should be taken, and for the most part a dissection must be made."

The importance of medical testimony in the cases now under consideration, will readily be appreciated. It may, and indeed frequently does, decide on the life of an individual; and some preliminary cautions repecting the conduct of the physician, or surgeon, may hence, with propriety, be introduced in this place.

The first observation which I shall offer, is a caution to the examining physician, not to permit sudden prejudice to warp his mind. There is nothing more common among the populace, who crowd around the bodies of persons found dead, than to suspect that they have been murdered; and the idea, instead of being judiciously combatted, if untrue, is permitted to gain strength by repetition. Against charges of this nature, the physician should always be prepared, and never allow them to have any influence over him. He should proceed to the examination of the body with a mind free from prejudice. He should also recollect, that sudden death is not an uncommon event, and that those who, at one moment, we see before us in the full enjoyment of life, may, at the next, be cold and inanimate. The secret, operating causes of this change, may remain unknown to us, and we can perceive only its effects. In addition to this, there are many circumstances which may be the origin of the sudden disease, and to which the person affected has been for a time exposed, without any knowledge of their consequences. Of this nature, are the breathing of noxious gases, the use of improper aliments, or of unhealthy water. The passions also, if highly excited, or a purely accidental cause, may respectively have caused the sudden death. And, lastly, the destruction of life may have been caused by the person himself. All these *possible* circumstances should be recollected, and before a case of this kind is referred to a criminal court, on the decision of a physician, which is generally the case, he should feel perfectly convinced that death has not originated from one of the three following causes: 1. Some internal cause. 2. Some external accidental cause; and 3. suicide. On each of these, a few observations will be necessary.

(*a*) The sudden rupture of an aneurism in one of the large cavities,

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is taken into custody, until the opinion of the lord-advocate or his deputy arrives, which is, generally, in as short a time as it can be done, consistently with sufficient deliberation, when, if there does not appear to be sufficient evidence to ensure a conviction, the prisoner is liberated. To guard against the abuses which might arise from this system, a private prosecutor may take up the case. From this mode of proceeding, there are more convictions in proportion to the number tried in Scotland than in England, and much vexatious imprisonment is saved to the lieges.—Editor.

frequently produces instant death. So also does the bursting of purulent cysts in one or other of the viscera. But in both these cases, there are generally premonitory symptoms which indicate danger, and indeed cannot have passed without notice. Apoplexy, however, is a disease which, in some instances, may be mistaken in its early symptoms, and may terminate fatally in situations which preclude any observation of the event. We should here attend to the conformation of the body—the large head, short neck, and plethoric frame: to the posture in which the person is found—the food he has lately eaten—and the ligatures that surround any part. What is termed serous apoplexy, sometimes leaves no traces of disease, and practitioners have hardly been enabled to suggest the cause of death. In this instance, however, if no suspicious appearances be present, there can, of course, be no mistake as to the cause. But in ordinary cases of apoplexy, an examination of the brain and stomach sufficiently developes the nature of the complaint; and it should be borne in mind, that the individual may, when seized, fall from a height, and thus bear the marks of external injury.

It is not necessary, nor indeed would it be practicable, to enumerate all the causes of sudden death belonging to this division of our subject. A stroke of the sun, a fit of violent anger, intemperance in the use of spirituous liquors, epilepsy, gout, and a variety of other agents, have produced the sudden extinction of life.*

(*b*) The external accidental causes which may produce sudden death, are, amongst others, the following: exposure to noxious gases—to cold and hunger—an immoderate use of spirituous liquors—the imprudent drinking of cold water, when heated, and lightning.

The first of these is sometimes made an instrument of murder, and, as such, I shall hereafter notice it. But, at present, it may be observed, that accidents frequently occur from noxious inhalation, accompanied with circumstances that sufficiently indicate their cause. Such, for example, is the case when miners are found dead near the places where they worked—when a body is found near a lime-kiln, or when life is suddenly destroyed on going into a well, or a cellar that has been long shut. The use of charcoal, in close chambers, has proved fatal to many. The evidence, in all these instances, is sufficiently powerful to assign the cause to accident, unless the appearance of the body leads to a different opinion.

Death, from exposure to cold, is not uncommon, and if it happen at a distance from towns or dwellings, is generally characterized by circumstances not to be mistaken. It may, however, occur in populous places, and it is then more liable to misconstruction and suspicion. It is a ready conjecture that the sufferer has made an attempt on his own life, and, in all such cases, marks of hunger will generally be found combined with the other appearances. Dissection must here also be the guide, and we shall hereafter indicate the points most worthy of attention.

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* Some remarkable cases of sudden death are mentioned by Mr. Chevalier, in the Medico-Chirug. Transactions, vol. 1, p. 157. He denominates the disease *asphyxia idiopathica*. The heart, on dissection, was found flaccid, and all its cavities were entirely empty of blood.

The same remark applies to those who die from taking a quantity of spirituous liquors. The fluid here acts literally as a POISON, and it will be considered as such in a subsequent chapter. But there is a cause of sudden death, which is becoming quite frequent during our summers, and which is altogether accidental. I refer to the drinking of cold water, when the body is heated from exercise. The person whose imprudence instigates him to this, generally falls down dead in a few moments. It is not to be supposed that any great change from the state of health will be observed on dissection, and we must therefore rely principally on the history of the case. It is to be regretted that examinations *post mortem* have not been made more frequently in these instances.

As to death by lightning, it may be remarked, that this is usually distinguished by a variety of appearances. Sometimes the viscera are destroyed, without any external mark being present, while in others there is nothing to be seen but a small hole. Again, there will be great external injury observed. But the most common accompaniments are discolouration of the skin, generally in the form of streaks. These are of a red colour, and it has been remarked, that they are peculiarly to be traced in the direction of the spine. "It is also said, that the bodies of persons killed in this manner are unusually flaccid, that the blood is found in a fluid state, and there have been inflammatory appearances internally." These, however, are not to be viewed as conclusive, since they are observed in death from other causes.* But if an individual be found in an open place, or under a tree, shortly after a thunder-storm, with the ordinary appearances mentioned above, we may attribute his death to lightning; and particularly so, if the metallic substances about him are found melted, and his clothes burnt or consumed, while the dissection exhibits nothing adverse to the idea.†

(c) Whether sudden death is caused by suicide or homicide, is often a most difficult question to determine. I shall here only allude to some general circumstances which require attention, and reserve the more minute examination for the respective sections of this chapter.

The moral history of the individual ought to be ascertained—his disposition of mind, and his worldly condition. It is a proper subject of enquiry, whether he has met with losses or disappointment;

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* The bodies of those who are struck by lightning, are not always found flaccid. Dr. Francis mentions, that he has seen a case where the muscles immediately became excessively rigid, and he refers to Baccaria for a similar example.—New-York Med. and Phys. Journal, vol. 2, p. 21.

† Many cases of death or injury by lightning, together with the appearances observed, are to be found in the Philos. Trans. See vol. 1, p. 222—247. Vol. 5, p. 2084. Vol. 19, p. 311. Vol. 20, p. 5. Vol. 21, p. 51. Vol. 22, p 577. Vol. 26, p. 137. Vol. 33, p. 366. Vol. 34, p. 118. Vol. 36, p. 444. Vol. 48, p. 86. Vol. 51, p. 38. Vol. 52, p. 515. Vol. 62, p. 131. Vol. 63, p. 177 and 231. Vol. 66, p. 493, Vol. 71, p. 42. Vol. 77, p. 61 and 130. Vol. 80, p. 293. There is also an interesting account of the celebrated death of Richman, at St. Petersburgh, vol. 49, p. 61.

whether he has been solitary in his habits, and whether any of his family or connexions have an interest in his death. The season of the year should be noticed. Dissection, also, should not be omitted. Morgagni observes, that he found the brain of maniacs of an extraordinary hardness;[*] and Durande and Fourcroy have found in suicides associated to this state of the brain, an induration of the liver, with calculi in the gall bladder. The circumstances of each case deserve close and attentive examination, since each has its peculiarities.[†]

The importance of medico-legal dissection will be readily observed after a perusal of these preliminary observations. It is, in fact, the only sure guide for the physician, and the necessity of attending to it is inculcated by every sentiment of professional pride, as well as by the feelings of common humanity. The medical examiner generally dictates the verdict of the coroner's jury, and it is but a sorry excuse, after a suspected individual has lain for months in a gaol on the strength of his opinion, then to come before a court, and say, he drew wrong inferences from external appearances; or, on the other hand, to meet a brother practitioner who invalidates his opinions, and demonstrates the crudeness and insufficiency of his investigations.

In further noticing this subject, I shall consider it under the following sections:

1. Of medico-legal dissection.
2. Of persons found dead from noxious inhalations.
3. Of persons found hung.
4. Of persons found strangled.
5. Of persons found drowned.
6. Of persons found smothered.
7. Of persons found dead from wounds.
8. Of persons found burnt to death.
9. Of persons found dead from hunger.

The subject of wounds generally, and of poisons, would probably, in perfect strictness, belong to the present title, but as they are very extensive and important in their nature, I prefer considering them in distinct chapters. This division will also allow us to consider their effects upon the living body.

1. *Of medico-legal dissection.*

Under this head, I shall give general rules for the examination of dead bodies, applicable to all cases where investigations are required.

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[*] Though I have examined a good many maniacs, I never found but one whose brain shewed any considerable induration, and that was in the case of a very old female, who had been for many years confined in the lunatic cells of the poor-house of Glasgow; her disease displayed itself chiefly in an excessive love of every kind of malicious mischief. The last act of her life (and there was hardly strength enough left to perform it), was to upset a close-stool on the silk-stockings of a spruce M.D., who, the day before, had obtained his degree.—EDITOR.

[†] The general course of remark, in these preliminary observations, is taken from Foderé, vol. 3, p. 1 to 14; and its similarity to sec. 1, chap. 2, of Smith's Med. Juris. will be readily observed by those who peruse the latter work.

There are, however, some instructions particularly required in instances of supposed poisoning, which I shall postpone till we come to that chapter.

The manual published some years since on this subject, by Dr. Rose, in Germany, and translated by Dr. Marc into French, in 1808, is so complete and excellent in its matter, that I shall copy from its pages with great freedom.*

Before proceeding to the dissection, it is proper first to examine the external situation and appearance of the body; and, to facilitate the investigation, the following rules may be observed: 1. If the death be apparently caused by a wound, the body should be first viewed, if possible, exactly in the position in which it was found. By moving it, the attitude of the extremities may be altered, or the state of a fracture or a luxation changed, since the internal parts vary in their position with one another, according to the general position of the body. If it is absolutely necessary to remove it, it should be done with great caution. 2. The clothes should be removed, as far as is necessary, and it should be noted what compresses or bandages (if any) are applied to particular parts. 3. After these preliminaries, we must examine the colour of the skin, the temperature of the body, the rigidity or flexibility of the extremities, the state of the eyes, and of the sphincter muscles, noting, at the same time, whatever swelling, ecchymosis, wound, ulcer, contusion, fracture, or luxation, may be present; also, any fluid flowing from the nose, mouth, ears, sexual organs, &c. and indeed every thing varying from the natural state. The above cavities should be inspected, and particular attention must be paid to the state of the skin, so as not to mistake that bluish-brown tinge, which indicates the commencement of putrefaction, for ecchymosis. The distinction between these we shall presently explain.

At this period, it may sometimes be necessary to delay the dissection for a few hours, and the wish of the examiner is, of course, to prevent putrefaction. To effect this, it has been recommended to put the body in a cool place, and cover it with ice, or it may be sprinkled with spirituous or aromatic substances. If it is intended to preserve it for some time, it should be washed with a strong solution of common salt and alum. The cadaverous smell present during the examination may be obviated, in a great degree, if the change be not too far advanced, by passing a current of chlorine, or the fumes of tobacco, through the chamber.

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* See the title in the list of works consulted. I must, however, remark, that the dissertation of Mauchartus *de inspectione et sectione legali*, resp. J. M. Sabler, published at Tubingen, 1736, and republished in Schlegel, vol. 1, p. 76, anticipates most of the directions that are given by Rose.

In medical jurisprudence, more than in any other science, every author must gather both his rules and his facts from others, as the personal experience of no ten men combined would make even a tolerable code of instructions to the practitioner. In addition to the authors quoted, very excellent rules for the dissection of bodies for practical purposes, will be found in an essay on the subject, by M. Renard de Chalon, published at Paris in 1819, and bound up with some other essays on legal medicine; and also in the instructions of Mr. John Shaw, of the Great Windmill-street anatomical-theatre, as laid down by him in his manual for the student of anatomy.—EDITOR.

From the period when the dissector commences, until he concludes, there should be a clerk at hand, taking down all the facts he may from time to time communicate, and this should not be delayed until the examination is completed, as many circumstances of importance may otherwise escape his memory.

If there be an external lesion present, it should first be examined, and its nature described—its length, breadth, and depth—also, whether it has been inflicted with a cutting, pointed, or round instrument—whether it is accompanied with inflammation or gangrene, and whether any foreign bodies are found in it, such as balls, or pieces of cloth. The scalpel should then be employed to trace its extent, but with judgment, so as not to render our researches useless, and to prevent a comparison of the external wound with the internal injury. The nerves and blood-vessels, and particularly the arteries that are wounded, should be named, as should also the viscera, if any are in that state. *If there be a contusion without a solution of continuity,* the injury found in the internal parts should be particularly noticed, such as extravasation, rupture of vessels, &c. *If the cause of death is a burn,* its degree and extent should be examined, together with the state of the parts affected, whether inflamed merely, or covered with blisters—the fluid contained in these blisters, and the condition of the neighbouring parts, whether sphacelated or gangrenous. *If a luxation or fracture be present,* notice the surrounding soft parts—the nature of the injury, whether simple or complicated, and the phænomena indicating the progress of disease or of recovery.

Having stated all these circumstances, it is next necessary to proceed to the dissection in a systematic manner, and the rule here is, to commence with an examination of the abdomen, as that part is most liable to run into putrefaction. We, however, should not desist, because we suppose that the cause of death is perfectly discovered in one or the other cavity: all of them should be investigated.

On viewing the head, the integuments are to be inspected, and all injuries done to them are to be noticed. In particular, if a wound appear to be inflicted by a sharp-pointed instrument, its depth, direction, and connection with the brain, should be minutely traced. The presence of inflammation, œdema, or sphacelus, must also be remarked. The same observations apply to injuries from cutting instruments. The bones of the cranium are next to be laid bare—search is to be made if there be no fissures or fractures, taking care, at the same time, not to mistake irregular sutures for them; and, for this purpose, they should be rubbed over with ink. The strength of these bones is also deserving of minute inspection, as they not unfrequently are so thin or soft as to render a blow very destructive, but which under ordinary circumstances would only produce slight injury. The fracture should always be followed throughout its whole extent.

The membranes and the brain must be carefully inspected. Let it be noticed whether any pus or blood is interposed between the dura mater and the bones, or whether it is detached or inflamed. All morbid appearances in structure deserve attention, and the state of the vessels of the brain, the fluids present, and their situation, together with the changes in the substance, are highly deserving of attention. It should, however, be remembered, that death sometimes follows from blows on the head, when no internal lesion can be found on dissection. It has been abundantly proved, that the connexion between the brain and the viscera of the thorax and abdomen are the cause of this, and the injury is therefore to be looked for in the latter.

The vertebral column must be viewed throughout its whole extent, as to its being fractured, or dislocated, or contused. This part requires strict attention, since injuries of it are often of a very complicated nature. Foderè quotes a case from Jaegar, of a person who was struck on the neck, by a loaded waggon, with such violence that both his upper and lower extremities became paralytic. He died in eighteen hours after the accident. No external appearances of injury could be observed, although an examination readily indicated that the seat of disease was somewhere near the sixth cervical vertebra; and accordingly, on dissection, its spinous apophysis was found broken at its base, and separated from its body, while blood was extravasated to the amount of four ounces.

We should inquire carefully whether the neck bears any marks of external injury, or traces of ecchymosis, or pressure on it. Examine the great blood-vessels, whether they are filled with blood, or empty—and the nerves, whether they are in their natural state. The œsophagus, pharynx, and larynx, must be noticed. If wounded, detail the extent, depth, and shape of the injury, and particularly if the lesion is caused by fire-arms—its course, and the loss of substance present, together with the inflammation or suppuration (if any) existing, should be stated.

On proceeding to the thorax, it should first be ascertained whether the injuries it has received are superficial, affecting the integuments and muscles merely, or whether they extend to its cavity. If the latter, the following are subjects worthy of observation. The blood-vessels—the bones covering the thoracic viscera, enquire whether any of these are fractured, luxated, or diseased. Next, as to the respective organs—notice the lungs, and their internal as well as external condition—the pericardium and its contents—the heart and its great vessels—the diaphragm—the thoracic duct, and the phrenic nerves: all injuries or diseases of these should be stated in the report.

Lastly, as to the abdominal cavity. Its external covering forms a subject of enquiry. Every spot, swelling, or extravasation, should be noticed, as also whether hernia be present, or whether there is any tumefaction of the part. The organs peculiar to either sex should be examined, and also the various viscera contained in this cavity—the stomach, mesentery, liver, spleen, gall-bladder, intestines, bladder, &c. &c. We should view each part as to the quantity of blood which naturally belongs to it—trace all extravasations as to their quantity and nature, and particularly enquire whether the changes observed are the result of disease, or of sudden injury. Professor Mahon recommends the use of a blunt pointed bistoury in examining the intestines, as this may prevent injury during the dissection. The contents of the stomach and intestines should be analyzed, and those of the gall-bladder and urinary-bladder inspected.

All wounds should be probed cautiously, so as not to produce greater injury than is already present, and the blood that is extravasated in a cavity, should be carefully removed, before a new dissection is commenced. In this way, the quantity appertaining to each can best be ascertained. If any of the viscera seem to require a more strict investigation, they may be removed from the body after the general dissection.

From this enumeration, it will readily be seen how necessary an accurate knowledge of anatomy is in such cases, so as not to mistake the appearances which are naturally found for extraordinary occurrences, or the effects of disease for those of violence.

Having completed the dissection, the notes should be taken and reduced to order; and, in preparing the report, or in giving testimony, it should be as simple and plain as possible, avoiding all those terms which are unintelligible to a court and jury.*

While forming an opinion, the physician must recollect, that there are certain phenomena observed on the bodies of the dead, which may be mistaken for the effects of violence, and yet are only the consequence of previous maladies. Again, there are others which are the result of the extinction of life, while by the vulgar they are deemed proofs of murder.* A notice of these may be useful, in order to establish the distinction between violence exercised on the living or the dead body. I shall mention the following: Hæmorrhages, ecchymosis, congestions of blood, inflammation, and marks of severe suffering.

Hæmorrhage is supposed by many to indicate an existence of the circulation when it commenced, and accordingly they consider it *prima facie* evidence, that life was present when the supposed violence was offered. On this, however, it may be remarked, that if such a rule be laid down as universally true, it will lead to dangerous errors. It is frequently observed by anatomists, on opening the bodies of those dead from apoplexy, or malignant fever, that blood flows from the mouth, nose, or ears. The blood in these instances is of a black colour, and apparently more fluid than in its natural state. Hæmorrhage, then, if observed on the dead body, is of itself no proof that a lesion was inflicted on the living one, and in order to warrant an opinion of this kind, the large vessels should be found empty, and the blood of a florid red colour.

Ecchymosis, contusion, sugillation, and various coloured spots on the skin, are also appearances that may occasionally lead to error. It is important that the distinction between these terms should be properly understood, and the following observations from Belloc are therefore worthy of remembrance. The term *contusion*, is derived from the Latin word contundere, to bruise or pound, and hence conveys a similar meaning. *Ecchymosis* is a Greek term, and is equivalent to effusion, or spreading of blood into the cellular tissue. It is present whenever the contusion is sufficiently violent to produce the rupture of a blood-vessel, and it communicates a colour more or less livid to the skin.

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* The most valuable writings on medico-legal dissection, are Marc, as already stated, p. 1 to 54. Mahon, vol. 2, p. 217 to 257. *Ouverture des Cadavres*, and Foderè, vol. 3, chap. 1, sect. 1. Some valuable remarks may also be found in Dease's Remarks on Medical Jurisprudence. It will be understood that every species of violent death requires an investigation in some degree peculiar to itself, and the minutiæ of this will be noticed under each section. I have only thus far laid down general rules, and postponed the rest to prevent repetition.

Contusion may then exist without ecchymosis, but the latter is always the consequence of the former, and both originate from some external cause. Ecchymosis differs from *thrombus* in being less circumscribed, and possessing the characteristics of a tumour in a less distinct degree.

Sugillation is also an effusion of blood into the cellular membrane, resembling, at first view, an ecchymosis, but it originates from internal causes, such as the commencement of the putrefactive process, and hence often occurs in the living body. The livid, dark-coloured spots, which under the above circumstances are often seen, belong to this division, and they must be familiar to those who view the bodies of persons dying from malignant fevers, scurvy, &c.*

It will readily be remarked, how important an accurate distinction between ecchymosis and sugillation must become, in doubtful cases. Zacchias has suggested the following: when this discolouration is the consequence of external violence, a conjestion of thick *concrete* blood will be found; but, in the spontaneous spot or sugillation, the blood on incision will be seen *fluid*. There is probably considerable truth in this, although observers have not, in all cases, proved the difference. Stoll, of Vienna, examined the bodies of two females, who died of petechial fever, and observed spots which extended to a considerable depth, and contained a large quantity of extravasated blood. They had all the appearance, he adds, of being caused by external injury.†

Belloc relates an instructive case which came within his own observation. During the prevalence of an epidemic small-pox, a husband maltreated his wife, who was five months advanced in pregnancy. He gave her several kicks on the thighs and abdomen. A week afterwards, she was seized with the small-pox, and died in a fortnight after the injury, covered with dark-coloured spots, and also with marks of the disease. In this condition she was buried, but her relatives hearing of the ill-treatment she had received, complained of the husband, and the body was accordingly disinterred and examined by physicians. They decided, both from the symptoms present during her illness, such as violent hæmorrhage from the nose, and from the appearances observed on the bodies dead from this epidemic, that the cause of death was the small-pox, and that the sugillations were the consequences of its malignity.‡

I should not recommend an implicit dependence in the test of Zacchias, although it certainly deserves attention. When sugillation is supposed to be present, it should be particularly noticed whether it appears on a depending part. The time that has elapsed since the death of the subject, and the prevalence or absence of putrid epidemics. also require consideration. On one point, however, we should place a strong reliance, and that is, when marks of this kind leave a distinct impression of the instrument of murder. Thus, on a person hung, an ecchymosis marking the course of a rope is a certain proof; and again, similar marks of cords on the extremities indicate, most conclusively, that these injuries have not been inflicted on a dead body.[*]

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* Belloc, p. 315-316.

† Mahon, vol. 2, p. 210-211.

‡ Belloc, p. 317-318.

Congestions of blood in the viscera are often found after death, in persons who have been subject to disease. In such cases, the vigour of the circulating system, and the action of the nervous one, are illustrative of the truth; since, on dissection, if violence has been used, they bear the mark of having occurred recently, and they are also particularly noticed in the head and lungs, while in ordinary cases they are more extensively diffused. It should also be remembered, that blood is sometimes found extravasated in one or more of the large cavities, and is to be considered as a natural appearance, unless we find some of the blood-vessels injured. Foderè quotes a remark of Vicq D'Azyr, respecting the presence of several drops of blood being almost always observed by him on dissection in the *torcular herophili*, and that great anatomist attributes this to the position in which the head is usually placed after death. The blood goes to the depending part.[†]

Wounds received before death are marked by red, bloody, and separated edges. Those inflicted afterwards are livid, and their edges close to each other. Similar appearances charactérise contusions or blows, in which there has been no solution of continuity; and, on dissection, they are, if inflicted on the living, found to be sub-cutaneous wounds: vessels are seen torn and fluids extravasated, and the whole exhibits the marks of tumour in its elasticity and circumscribed shape. Violence to the dead body can only produce livid flaccid spots, unattended with engorgement or tumour. Gangrene also is marked by its being surrounded with a red edge: putrefaction is not, and the spots caused by the latter are of various colours. Dry gangrene cannot take place on the dead body, since there is no heat, or action of vessels to produce it, but the disorganization observed is of a humid nature.

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[*] Marc, p. 11.—See also Bose *de sugillatione in foro cautè dijudicanda*, in Schlegel, vol. 4, p. 67. The following case may be read with profit by all medical men. John Stringer was tried at the Lent assizes, held at Kingston, in the county of Surry, in the year 1765, before the late Chief Baron Smythe, for the murder of his wife, and found guilty. It appeared that they had frequently quarrelled, and a *young surgeon gave it as his opinion, that some appearances in the corpse were somewhat the appearances of a mortification occasioned by bruises*. Mr. Carsan, an eminent surgeon in the neighbourhood, had, on the report of the murder, from mere curiosity, examined the body, and was so clear that there were no marks of violence thereon, that he had not the least apprehension of the possibility of Stringer's being convicted; but hearing of it, he stated the case to the Archbishop of Canterbury, obtained a respite from Baron Smythe, and finally was the means of obtaining a complete pardon from the King.—Philips' Law of Evidence, Appendix, p. 105.

[†] Foderè, vol. 3, p. 30. In hot climates, or even in the hot season of the year, it must be remembered that the changes are most rapid. Dr. John Davy mentions a fact observed by him in Ceylon, which deserves attention. If the interval between death and the examination of the body was twenty or thirty hours, the serous and mucous membranes appeared red and inflamed, and particularly those parts which are most exposed to the action of the blood, as the valves, and the lining membrane of the heart and blood-vessels. The viscera also appear dark and livid. He attributes this to the exudation of bloody serum, which tinges the parts in such a manner as to exhibit the appearance of real inflammation.—Medico-Chirurg. Transactions, vol. 10, p. 89.

There are circumstances, however, which invalidate the importance of this sign, and render it somewhat doubtful. Thus, for example, a man may die of a wound, before inflammation commences. Others are so debilitated, that wounds on them have livid and dry edges, and, after death, can scarcely be distinguished from those inflicted on the dead. These circumstances should be kept in mind.

The signs which seem to indicate *pain*, or *spasms*, should be observed, but never greatly depended upon, since a natural death is often preceded by them.*

The following case may serve as a useful corollary to the observations contained in this section.

The widow Montbailly, of St. Omers, aged sixty, and of a very gross habit, was much addicted to intoxication, and in fact was inebriated daily. On the 27th of July, 1770, at 7 A. M. she was found dead in her chamber, laying on a trunk which had sharp edges. A physician and surgeon visited the body on the next day, (thirty-two hours after her death had been discovered,) and reported, that they found ecchymosis and contusions on the arms, thorax, and particularly over the third, fourth, and fifth ribs. The neck and upper part of the breast were also ecchymosed. The head was swelled—blood was extravasated under the skin of the face, and the nose was filled with clotted blood. On the eyelid there was a wound of nine or ten lines in extent, which penetrated to the orbit, and which might have been caused by a sharp or cutting instrument, but could not, in their opinion, have produced sudden death. On opening the body, all the internal parts were found in a natural state.

The reporters gave it as their opinion, that the ecchymosis, the swelling of the head, and the extravasated blood, were occasioned either by a fall, or by blows from an opposing body, and that the female had died either from the hæmorrhage occasioned by the wounds, or from suffocation.

A physician, who from curiosity had attended the examination, but who was not of the commission, stated that the eye was ecchymosed, and that the edges of the wound were irregular and indented.

On combining the result of this inspection, with the fact that the defunct had formerly repeated quarrels with her son and daughter-in-law, it became the prevailing opinion that they had murdered her. The superior court of Arras, before whom the cause was tried, condemned Montbailly and his wife to be broken on the wheel, and it was actually executed upon him. The wife claimed a delay on account of her pregnancy, which was granted. During this interval, a revision of the trial was procured, and the celebrated Louis was consulted, as to the point whether the facts stated proved that the woman had been assassinated. The result of his investigation was, that there was no certain proof of the commission of murder, and that all the circumstances enumerated were stronger proofs of the individual having died from apoplexy, than from any other cause. The following are some of his reasonings and remarks:

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* On these equivocal signs, see Mahon, vol. 2, p. 200 to 217, *Mort Violente;* and also Foderè, *Loco Citato.*

Intemperance predisposes to sanguineous apoplexy, and the reporters have neglected their duty in not opening the head of the deceased, since, by doing so, the condition of the internal parts would have explained the cause of the hæmorrhage. Again, a person in a state of intoxication, and predisposed to this complaint, would, on falling against any sharp-edged subtance, naturally lose a considerable quantity of blood, and also have the arteries and veins of the head much distended. He totally discards the idea that the hæmorrhage from the wound of the eye was the cause of death.

As to the ecchymosis, or livid spots, found on the thorax and arms of the deceased, and which the reporters attributed to blows or falls, M. Louis observes, that they are the ordinary appearances found on those who die in the state of intoxication, and, among others, quotes the following case, in confirmation, from Morgagni. A beggar went to bed drunk, and died suddenly during the night. This was at the end of January, 1746. On the next evening he was carried to the anatomical hall in Padua, and on the third day after his death he was dissected. Morgagni found the body still warm. The scrotum was ecchymosed, of a red colour, the face filled with blood, not only under the skin, but all the muscles; the membrane that separated them and the glands, appeared engorged. Louis remarks, that these spots should have been particularly examined, in order to have founded any charge upon them.

It appeared further, that the body was examined at the end of the month of July. Might there not have been some incipient putrefaction present, and would not this account for the swelling of the head, the lividness of the thorax, and other similar symptoms? As to the wound in the eye, the reporters themselves leave its effect uncertain, while the cause might have been accidental.

On these grounds, Louis gave it as his opinion, that the report was inconclusive, and that there were no proofs of assassination. The superior court of Arras accordingly, in 1772, revoked their decision, exonerated the memory of Montbailly, and enjoined the physicians and surgeons thereafter to extend the examinations to every part of the bodies of those found dead,[*] and also to state in their reports the scientific reasons for all opinions they might give.[†]

It will form a proper conclusion to this section, to notice what degree of putrefaction is compatible with a proper dissection. This question often arises when bodies are disinterred for examination, and on trials it is also a fruitful source of discussion.

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[*] A learned professor, in a certain northern university, gave his pupils a very different advice; "When," said he, in his lectures, "you find any appearance sufficient to account for death, rest satisfied with that, and enquire no further; as further examination will only tend to embarass your evidence, and render it contradictory." We have all heard of a worthy country justice, who made it a rule never to hear both sides of a question, because, when he only heard one, he could decide without hesitation; but hearing both only puzzled him.—EDITOR.

[†] Foderé, vol. 8, p. 64, from the *Causes Célèbres*.—See also, at page 98, a similar case from the same. *Cause de Chassagnieux*.

Putrefaction commences gradually when the vital principle is extinguished, and after a certain period, which, however, differs in different bodies, according to the previous diseases, the season of the year, its temperature, &c. it produces, an extensive disorganization, confounding the cause of death, and rendering it dangerous for any one to examine the body. In such cases, it is evidently not the duty of the physician or surgeon to risk his life. Louis the 15th of France, died from small-pox, and his body was purple and gangrenous with the disease. The chamberlain desired that, according to etiquette, La Martiniere, the first surgeon to the king, should open the body. This last, being aware of the danger, observed that he would perform his part, provided the chamberlain, according to the same etiquette, was present, and held the head of the deceased during the operation. He warned him, however, at the same time, that he could not answer for his life, if it was done. The chamberlain spoke no more of it, and the king was interred without any dissection.* I mention this anecdote for the benefit of those who may be improperly urged by magistrates.

After a certain period, then, it will be impossible to form a correct judgment on the state of the soft parts, nor ought any investigation to be permitted, since it can only lead to conjecture. There is however an exception, and that is, when wounds have been inflicted by fire-arms, or by an instrument which leaves them of a considerable size. The traces of these are generally so very distinct, as to be judged of on bodies, for a considerable period after death. The blows of an axe, says Foderè, were very visible in one case, where the body had been buried thirty days. This subject however retained a more than ordinary degree of freshness.

This difficulty respecting the soft part is of course obviated, when we examine the hard parts. A fracture may be as distinctly observed, and is as good proof, two months after death as one day, and this notwithstanding the putrefaction that may be present. A dead body was found in the field, in the *arrondissement* of Trevoux, during the month of May 1811. The surgeon, deterred by the putrefactive smell, reported generally that he had discovered no marks of violence. Meanwhile, some ditchers, on interring the body, remarked that, *on the fall of a handkerchief which covered the head*, the bones of the cranium detached themselves, and the brain issued out. The imperial attorney immediately ordered a special examination of the head, and it was found that this person had received three blows from a cutting instrument, which separated the parietal bones from the skull. The assassins, after committing the crime, had replaced them and secured them with a handkerchief bound very tight. They were afterwards discovered and punished.†

Many circumstances develope or delay the progress of putrefaction. Heat, humidity, and the contact of air accelerate it, and it is always most rapid when, from the presence of a typhoid disease, it appears to commence before life is extinguished. Interment delays putrefaction, and some species of earth, more than others. Taking these facts into consideration, it will be found useful to attend to the following statement of the progress of putrefaction, and the comparative utility of dissection in each. It has been proposed by Dr. Boissieu.

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* Belloc, p. 321.

† Foderè vol. 3, p. 72.

First degree. A tendency to putrefaction. It consists in a slight alteration of the body, a softness of the flesh, and a disagreeable odour. *Dissection is practicable and still useful.* And here let me remark, that all appearances, even those which are deemed certainly indicative of putrefaction, should be stated. They may prove the foundation of useful deductions.*

Second degree. Commencing putrefaction. A fœtid odour is present, the fleshy parts become light and assume a dark colour. *Dissection is already dangerous, and can be of no use except in particular cases.*

Third degree. Advanced putrefaction. The parts exhale an ammoniacal odour, mixed with a putrid smell. They fall into dissolution, and their colour is constantly altering. *Dissection is impracticable and useless.*

Fourth degree. Complete putrefaction. This is known by the complete dissipation of the ammoniacal odour, and also by the putrid smell losing its strength. The volume and weight of the parts is much diminished, and they separate into a gelatinous mucus, which gradually dries, and at last becomes an earthy and friable mass.†

A consultation by the celebrated Petit, will form a commentary on the subject now concluded.

A young man aged twenty, who, a short time previous, had passed through a mercurial course, amused himself during the whole day of 25th November, 1774, on the ice. In the evening, although in a state of prespiration, he put his naked legs and thighs in the snow, and remained there half an hour. He retired to bed as usual, and in the morning was found dead. The burial took place without any formalities. Ten months after, on a suspicion that he had been murdered, the body was disinterred and examined. On opening the thorax, a large quantity of blood was found in the left side, between the pleura and the ribs; and, corresponding to it externally, there was an extensive appearance of contusion. The question was put to Petit, whether this indicated that a blow had been inflicted? He answered in the negative, and observed, that during thirty years experience, he had always observed these ecchymoses to occur on the commencement of putrefaction—that the epidermis gradually separated from the skin, and, on opening the latter, a greater or less extravasation was found. This state was particularly to be expected in a young man, who died suddenly, and full of blood. The length of time that had elapsed, the consequent uncertainty of the proofs, and the danger of the dissection, are also adverted to by him. In consequence of this opinion, the suspected persons were liberated.‡

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* Marc, note to p. 4.

† Foderè, vol. 3, p. 73-74.

‡ Foderè, vol. 3, p. 75 to 79. There are some English law-cases which deserve mention, with reference to the present subject. "A man hanged himself, and the jury found him possessed of a messuage, which as a *felo de se* he forfeited. *Pengelly*,

2. *Of persons found dead from noxious inhalations.*

A vast proportion of the gases, discovered by modern chemists, are irrespirable. Few of them, however, are spontaneously generated, and their noxious power must of necessity be extremely circumscribed. We shall notice such as have proved destructive to life, under the head of poisons. But there are some which may be produced under ordinary circumstances, or are occasionally the results and accompaniments of peculiar situations and occupations; and of these, none is more deleterious than CARBONIC ACID GAS. This substance may be generated in various ways. 1. When a number of persons have remained during a long time in an apartment, or any other place where the air is not renewed. They mutually vitiate the air, and produce, by the process of respiration, the poison in question. The most striking and melancholy instance of this occurred at Calcutta, in 1756. When that place surrendered to Shujah Dowla, he thrust one hundred and forty-six Englishmen into the *black hole*, at Fort William, a place only eighteen feet by fourteen, and having only two apertures through which air could be admitted. They remained here from eight in the evening until the next morning, when only twenty were alive. A somewhat similar instance happened in London, in 1742. Twenty persons were forced into a part of St. Martin's roundhouse, called the *hole*, during the night, and in consequence several died. The surgeons on this occasion gave it as their opinion, that when the doors and windows were shut, the place could not support twenty persons without danger of their lives.* Individuals, in a state of suffocation from this cause, are seized with an unsupportable thirst. A copious perspiration is present, and great pain in the chest, difficult respiration, and intense fever follow. They lose their strength, and fall into a deep lethargy, to which death soon succeeds, if aid be not speedily given.† 2. The fumes of burning charcoal consist principally of this substance and carbonic oxide. This is unfortunately a frequent cause of death. Persons, on going to bed, leave pans of it burning in their apartments, and in the morning are found lifeless.‡ 3. Carbonic acid gas is contained in the exhalations from lime-kilns,§

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sergeant, moved to stay the filing of this inquisition, upon an affidavit that the man died five years before, and the coroner dug up a skull, which he knew by a particular mark was the deceased's, and thereupon the inquisition was taken, which he insisted ought to have been upon view of the whole body, that the marks, if any, may appear. *Court.* Stay the filing till further notice." (The King *v.* Bound. Strange's Reports, vol. 1, p. 22.) In another case, (Queen *v.* Clerk,) where an inquisition had been quashed, though the body had lain buried for seven months, the coroner took it up, and had another inquisition found. This was complained of. HOLT, Chief-Justice, said, "The body may be dug up again, but it ought to be upon fresh pursuit, and not at such a distance of time; *for it is a nuisance, and may infect people.*" —Salkeld, p. 377.

* Smith, p. 206.

† Orfila's Directions, p. 170.

‡ A large number of cases of this description is quoted by Dr. Dobson, in an essay contained in Percival, vol. 1, p. 328. See also Phil. Transactions, vol. 52, p. 454.

§ "June 19, 1818.—This morning, two lads were found senseless on a brick-kiln in St. George's Fields. The eldest was recovered by medical assistance, but the other was lifeless. It is supposed that they had resorted to the kiln for the sake of warmth, and having fallen asleep, were suffocated by its fumes."—Edinburgh Ann. Register, vol. 6, part 2, p. 64.

and cellars, where wine, beer, or other liquors are in a state of fermentation. Hence the danger of sleeping near the former, and the necessity of ventilating the latter. 4. This gas is frequently produced in wells, marshes, and mines. In the latter, however, a different substance is also generated, called the *fire-damp*, or carburetted hydrogen gas, which is no less deadly. But the frequency of fatal accidents to persons descending wells, is to be ascribed to carbonic acid.*

"Persons affected by this agent, feel a great heaviness or pain in the head, intolerable singing in the ears, a great disposition to sleep, and so great a loss of strength as to be unable to support themselves upright, great difficulty of breathing, and violent palpitation of the heart, followed by a suspension of the respiration and circulation. The senses no longer exercise their functions, and sensibility appears to be extinct.†

If they are discovered after the gas has had its full operation, their bodies present the following appearances: the head, face, and neck are swollen; the eyes are propelled from their sockets, but preserve their brilliancy often for two or three hours after death; the tongue is protruded, swollen, and inclined to one side of the mouth; the jaws are firmly closed; the face is livid; the lips are of a dark-blue colour; the abdomen is inflated; the body preserves its warmth for a length of time, and sometimes indeed is warmer than natural, while the limbs remain flexible for some hours.‡

It will be understood, that in some cases all of these appearances are not present, although the majority generally are. Much depends on the temperament of the individual, and hence the face is occasionally of a pale colour.

As respiration has been interrupted by this agent, the passage of the blood through the lungs is impeded, and consequently its transmission from the right to the left side of the heart. We find, accordingly, on dissection, that the blood-vessels, and particularly those of the head and lungs, are filled with blood, and this fluid is principally accumulated in the right side of the heart, and in the veins leading to it. The blood itself is black, and so fluid that it is discharged readily from the smallest incision. Effusions of serum, tinged with blood, are found, particularly in the ventricles of the brain, and in the bronchiæ, while the muscles are so soft as to be torn by the slightest exertion. The epiglottis is always elevated.||

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* I will add to these the following curious case. On the 12th of May, 1650, some forgemen at Leipsic were drinking in a chamber, where a child, twelve years old, was asleep. They amused themselves with passing a half-extinguished candle under its nose. The child awoke, but again fell asleep, and they continued this course for half an hour. It was shortly after seized with convulsions, or epileptic fits, and died in three days after. The parents complained of this to the magistrates, who consulted the Faculty of Medicine. They answered, that the fumes of a candle were identical with the vapours from charcoal and lime, and would produce the same deleterious effects.—Valentini's Pandects, vol. 1, p. 195.

† Orfila's Directions, p. 160.

‡ Struve, p. 52. Belloc, p. 184—185. See also the history of three cases by Dr. King, in the Edin. Med. and Surg. Journal, vol. 7, p. 180. He remarks, that the fingers and toes were curved, and the nostrils dilated.

|| Portal, in Medical Commentaries, vol. 8, p. 254. Belloc, p. 184. Dr. Babing-

The peculiar appearances which I have described are important guides in determining the cause of death. Dissection should never be omitted in a case where there is the least uncertainty of its being an accident. The loss of irritability in the muscles is strikingly greater from this cause of death, than is ever seen in cases from drowning, hanging, &c. and it is therefore worthy of particular attention. We should also notice whether no marks of injuries are present, which may excite doubt. The place, the circumstances under which the body is found, the noxious material that has been inhaled, all deserve investigation, and may lead to the truth.

Asphyxia also occasionally happens from inspiring the exhalations of privies and common sewers. The noxious substance, in this instance, is SULPHURETTED HYDROGEN GAS: and this, even when mixed with a large quantity of atmospheric air, is a very powerful poison.*

" When the exposure has lasted but a short time, the sufferer experiences a general uneasiness, accompanied with nausea and sickness; his respiration becomes irregular, but not difficult, and his pulse much agitated; the skin is cold, general convulsions take place, and the muscles of the chest and face are particularly affected.

In cases where an individual has been long exposed to the action of this gas, all power of motion and sensation is lost; a frothy saliva, tinged with blood, flows from the mouth; the lips and face are livid, the eyes are shut, and void of all brilliancy; the pupil fixed and dilated; the pulse is small and frequent, and the respiration short and difficult, and apparently convulsive; the action of the heart becomes disordered and violent, and the extremities are in a state of relaxation. To this succeeds an agitation more or less excessive, the muscles are attacked by alternate spasms and convulsions, and the body is curved backwards, while the individual appears to suffer from acute pain."†

In one case, where death followed, and dissection was performed forty hours after death, the head and trunk were already putrid, the skin bluish, and elevated by gas. The blood contained in the various cavities was black and fluid. The brain was greenish and tender. The bronchiæ were of a red colour, and the posterior part of the lungs were gorged with black blood, but that organ was generally crepitous. The stomach presented traces of a recent irritation, and the internal canal was greenish. The liver, of a greenish black colour, was in a state of congestion. All the viscera exhaled the smell of putrid fish, and several of the persons present at the dissection were subsequently affected with lassitude and stupor, sleeplessness, and violent cholic.‡ Experiments on animals have presented similar results.§

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ton's case of exposure to the vapour of burning charcoal, in Medico-Chirurg. Transactions, vol. 1, p. 98.—Orfila, vol. 2, p. 347. Larrey, vol. 2, p. 128.

* According to Thenard and Dupuytren, it is sufficient that the air contains 1-1300th of sulphuretted hydrogen, in order to kill a bird in a very little time; that which contains 1-800th, produces death in a dog of middle size, and a horse dies in an atmosphere containing 1-250th part of it.—Orfila, vol. 2, p. 371.

† Orfila's Directions, p. 167-168.

‡ New-England Journal, vol. 8, p. 279. Account of three cases extracted from the Nouveau Journal de Medicine, for April, 1818.

§ Orfila, vol. 2, p. 374.

3. *Of persons found hung.*

We understand by the term *hanging*, the suspension of a person by a cord, or some other ligature round the neck. The rapidity of death from it depends much on the manner in which the cord is adjusted—the texture and strength of the intervertebral ligaments—the fulness of the blood-vessels, and the strength of their coats. All these circumstances, together with that of the weight of the body, will render a shorter or longer space of time necessary to destroy life. Thus, for example, he will survive the longest, whose organs are of a firmer texture, whose vessels contain but little fluid, whose neck is long, and whose body is meagre.

It seems now to be well ascertained, that death from this cause may occur in one or two days. The first has generally been deemed a species of apoplexy, produced by pressure on the large blood-vessels that go to the head. The circumstance, however, that actually takes place, is a deep sleep, arising from the cerebral compression, unaccompanied with the symptoms that attend apoplexy, and in no case of recovery followed by the ordinary termination of that disease, viz. paralysis.[*] Foderè has collected some curious cases in illustration of this. Wepfer mentions an instance of a man and woman who survived hanging. The latter recollected nothing, and the former stated, that on the application of the cord, he felt no pain, but sunk as it were into a profound sleep. Morgagni also mentions, that an individual who recovered under similar circumstances, informed him, that the first sensation was flashes of light before his eyes, and that he then sunk into the same sleep. Our author also quotes a case on the authority of Lord Chancellor Bacon. A gentleman took a fancy to ascertain whether those who were hung experienced any pain, and actually performed the experiment on himself. He immediately lost all consciousness, and the event would have been tragic, had not a friend entered in time to cut him down.[†]

In these, and other cases on record, there does not appear to have been any of that convulsive state which generally accompanies apoplexy in a greater or less degree, nor in any instances were they succeeded by paralysis. It hence seems most probable, that asphyxia precedes death, which, however, will most certainly follow, if aid be not afforded. The compression interrupts the circulation between the head and the large blood-vessels proceeding from the heart, but it cannot prevent the circulation of the intervertebral veins and arteries, and death of course is not an immediate consequence of suspension, at least if no other fatal cause be interposed. The immediate cause of the stoppage of respiration, is undoubtedly the pressure of the nerves which are subordinate to that function.

It will, therefore, be more accordant to facts to say, that the first cause of death is an interruption, and then a cessation of the nervous action, and of course of respiration and circulation. There are still individuals, says Foderè, living in Marseilles, who, during the French revolution, were hung, and their lives saved in the night time, and who for a long period were affected with a ringing of the ears, and a species of deafness, indicating in a satisfactory manner that a lesion of the nervous action had taken place.*

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[*] See "a case of suspended animation by hanging, by Robt. John Thornton, M.D." &c. in the Lon. Med. and Phys. Journal, vol. 16, p. 529.

[†] Foderè, vol. 3, p. 134-5.

The phænomena that present themselves on inspecting the bodies of those who die from hanging in this way, are the following: the mark of the cord is evident around the neck, forming a livid, depressed circle—the face, chest, shoulders, arms and hands, are swelled and livid, and often a bloody mucus issues from the mouth and nose†—the countenance is distorted—the eyelids generally open, and the eyes red and projecting—the tongue is occasionally wounded by the convulsive motions of the jaws, and frequently thrust out of the mouth‡—the shoulders are raised, and ecchymosis is observed upon them, extending upon the breast, and down the arms—the fingers are bent, and the hand nearly closed.

The second cause of death from hanging, is one for which there is no relief. It consists, in addition to the compression, in a laceration of the trachea or larynx, or a luxation or fracture of the cervical vertebræ, occasioned by a rupture of the ligaments of the neck. The celebrated Louis enquired of several executioners, how they saved the lives of some criminals, while others were irrecoverably dead? They answered, that they caused, in the latter case, a laceration of the trachea, and luxation of the first cervical vertebra from the second, by placing the knot of the cord under the neck, and then giving a rotatory motion to the body at the moment when the ladder was taken from under his feet.§ This luxation chiefly occurs in heavy persons, or where they may have fallen from a height upon the end of the rope, or where attempts have been made to hasten death by increasing the weight of the body. So violent also is this sort of death, that the fæces, urine, and even the semen, are often expelled.‖ And the rapidity of the extinction of life is well illustrated by the result, in cases where the vertebræ are injured.

Dissection is of course indispensable in every case that may come before a criminal court. The neck should be carefully examined—all external marks and internal injuries noticed, and in particular the condition of the cartilages. The principal vessels of the neck and head are generally filled with blood, and the latter *sometimes* ruptured, and we should observe whether there is any extraordinary fulness below the mark of the cord. The lungs are usually livid, and its vessels, together with the right side of the heart, are full of blood. The pulmonary cells are distended, and do not collapse when the chest is opened.

I must not, however, omit to remark, that occasionally the countenance of persons hung remains pale, and bears but few external marks of cerebral compression. The suddenness of death may probably explain these rare appearances.*

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* Foderè, vol. 3, p. 140. † De Haen, vol. 4, p. 388.

‡ Dr. Smith remarks on this sign, that it is only produced when the rope presses upon the cricoid cartilage; when it presses above the thyroid gland, the tongue will be pushed back, owing to the compression of the os hyoides.—Smith, p. 217. See also Belloc, p. 170.

§ Foderè, vol. 3, p. 141. Dorsey's Surgery, vol. 1, p. 207.

‖ Male, p. 338. Smith, p. 217.

The medical witness may be asked two questions with respect to this subject, which it behooves him to investigate.

I. *Whether the person found suspended was hung before or after death?* or has he been previously killed in some other way, and then placed in this situation, to avert suspicion.

This question may be generally answered by refering to the data already laid down. When the person has been hung alive, the discolorations produced by the rope are very distinct, and pass all around the neck. The impression also will be of a red colour, and accompanied by that suffusion of countenance which we have already mentioned. On the contrary, if the suspension has been made after death, these marks will be wanting, and although there may be spots on the neck from the pressure of the cord, yet they will be of a livid colour, and distinguishable from contusions on the living body.† The appearances found on dissection are also an important guide.

The form and situation of the mark made by the cord should be ascertained: if it is at the bottom of the neck, it is probable that the individual has been strangled, for if suspended the cord would slip to the superior part of the neck. It may also happen, that a person is murdered by strangulation and afterwards suspended. In this case, we should expect to find two distinct circles on the neck, each characterised by its peculiarities.‡

The presence or absence of dislocation or fracture of the vertebræ is not to be greatly relied upon in settling this question, as it may have been produced by force subsequently applied, such as pulling hard at the feet.

Wounds, effused blood, and marks of violence are to be judged according to the rules laid down, when noticing medico-legal dissection.

Devaux mentions a case that illustrates this question. A female, aged 50, at Mantes (in 1683) was found suspended from a beam in a barn. The face was not discoloured, no froth issued from the mouth or nose, the tongue was natural, there was no change of colour around the shoulders, nor was the neck marked by the cord. It was determined to examine the body minutely, and a short investigation discovered a small wound, directly under the right breast, which, on being pursued, was found to have penetrated through the heart, and produced an effusion of blood in the thorax. It was evident that she had been thus murdered.*

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* I add the following circumstances in this place, merely as a historic curiosity. "March 16, 1814. On opening a vault at St. Maryport church, Bristol, the workmen discovered, very deeply concealed, a coffin of great antiquity. It is generally supposed that the corpse it contained was the body of——— Yeoman, Sheriff of Bristol in 1648, when the city was surrendered to the parliamentary army by Prince Rupert. Mr. Yeoman was hanged in Wine-street, opposite his own house, by order of Fairfax, for his attachment to the royal cause. The body was in the highest state of preservation, handsomely accoutred in the costume of the day, with gloves similar to those which the sheriffs at present wear. *And there were considerable tumours visible in the neck, which inclined several medical gentlemen, who inspected the body, to be of opinion that they were occasioned by strangulation.*"—Edinburgh Ann. Register, vol. 7, Chronicle, p. 30.

† The skin of the neck after death, says Petit, will be folded up and wrinkled by the cord. Foderè, vol. 3, p. 151.

‡ Male, p. 283-4. Mahon, vol. 3, p. 44.

II. The second question is, *Whether the individual has hung himself, or has been hung by others?*

As a preliminary remark, I would observe, that hanging is a difficult mode of perpetrating murder, unless the strength of the parties be greatly disproportionate, or the assailants be numerous and powerful; and, accordingly, we find it is most commonly an act of suicide. There are, however, cases, in which a decision is extremely difficult, as the marks left either from homicide or suicide, may be precisely similar.

We should first ascertain whether suspension took place before or after death—and, next, the immediate cause of death, as before stated. The instrument of death, that is, the cord, should be compaired with the furrow that it has made, so as to ascertain whether the diameter of the neck be much diminished by it. All the circumstances which indicate strangulation, are so far against the idea of suicide.†

The probability of the occurrence of luxation, or fracture of the vertebræ, is also, as I have already hinted, lessened when suicide is the cause.‡

Wounds and marks of violence on the body, are generally to be deemed proofs of homicide. But there may be suicides who injure themselves previous to suspension. De Haen records a case, of a person who, while hanging, inflicted several wounds on his face. These, however, we should not consider as the cause of death. A still more remarkable case is mentioned by Ballard, of a young ecclesiastic, who cut his throat partially, and then hung himself in the vestments of his office, and which he had arranged for that purpose.§

Dr. Male has also suggested, that wounds may possibly be accidental, as when a person, by swinging himself with violence, breaks the rope, and wounds himself by falling upon articles of furniture.||

The situation of surrounding objects, the state of the clothes, the appearance of the body, all deserve attention. "If the person be not elevated from the ground or floor at all, while the cord is not so tight about the neck as to strangle in this posture, and no other cause of death can be discovered, there can hardly be a possibility of doubt as to self-murder. A few years ago, a man, aged 75, destroyed him-

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* Devaux, quoted by Foderè, vol. 3, p. 153.

† Foderè observes, that in suicide, that portion of the cord which surrounds the neck, is relatively longer than in homicide, where the constriction will be more violent. The skin will also, in this case, be more drawn up towards the chin. (Vol. 3, p. 159.) Mahon remarks, that in assassination, the neck is sometimes so compressed, that the diameter of the circle described by the cord is not more than two or two and a half inches. He saw a female who had been hung, in whom the integuments alone resisted the cord—the vertebræ, muscles, and larynx, were separated, and the diameter of the circle was about two inches. Vol. 3, p. 49. It is, however, doubted, and, I think, justly, by Male, (p. 235,) whether this should be considered a conclusive proof of homicide. Much of the tightness of the noose must depend on its situation.

‡ There may, however, be instances of these occurring, as when the suicide throws himself from some height.—Belloc, p. 173-174.

§ Ballard, p. 409.

|| Male, p. 243.

self at Castle-Cary, by fixing a cord round his neck while sitting on the bed-side—leaning forward till his purpose was accomplished. His wife, who had for years been bed-ridden, and therefore not likely to have been fast asleep, was in the room during the transaction, and knew nothing of what was going on."*

The state of the mind of the deceased, his previous history, and situation in life, all deserve attention, and may aid us in forming an opinion, whether a predisposition to insanity has been present.

The following cases deserve the attention of all medical men.

A young man, eighteen years of age, and named *Bartholomew Pourpre*, was found dead, and hanging to a tree, at seven o'clock in the evening of the 12th of August, 1736. A surgeon, who examined the body, certified that he had been strangled. His father had married a second wife, who was on very ill terms with the young man, and had produced frequent quarrels and threats of murder between them Suspicion was, therefore, excited, but its probability was destroyed by the idea, that a father would not murder his son, and also, from the circumstance that he was fifty-two years old, and his son eighteen, and in full health and vigour. On this reasoning, the father was acquitted, and the son was deemed to have hung himself.

An order having, however, been made to prepare a statement of the suicide, and the cause being carried up to the parliament of Aix, the attorney-general discovered such facts in the statement of the surgeon, as led him to believe that Pourpre had not destroyed himself. It was mentioned not only by him, but by other witnesses, that the mark of the cord, instead of being at the upper part of the neck, was at its lower part, just above the shoulders; and, secondly, that the teeth were knocked in, and bloody. The parliament, from these facts, decided that the father had strangled him, and had put his foot on the mouth of his son, either to prevent his cries, or to hurry on the strangulation. The suspension, they declared, was subsequent to his death. Whether the father was guilty or not, we must at least say with Foderè, that two facts are well established in this case: 1. That the son had been strangled before being hung; and 2. That the strangling had been done, not by himself, but by others.†

Marc Antoine Calas was the son of John Calas, a merchant of Toulouse, aged seventy years, of great probity, and a protestant. This son was twenty-eight years of age, of a robust habit, but melancholy turn of mind. He was student of law, and becoming irritated at the difficulties he experienced, (in consequence of not being a catholic,) concerning his license, he resolved to hang himself. This he executed, by fastening the cord to a billet of wood, placed on the folding doors which led from his father's shop to his store-room. Two hours after, he was found lifeless. The parents, unfortunately, removed the cord from the body, and never exhibited it to shew in what manner his death was accomplished. No examination was made—the people, stimulated by religious prejudice, carried the body to the town-house, where it was the next day examined by two medical men, who, without viewing the cord, or the place where the death had been consummated, declared that he had been strangled. On the strength of this, the father was condemned by the parliament of Toulouse, in 1761, to be broken on the wheel. He expired with protestations to heaven of his innocence.

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* Smith, p. 278.

† Foderè, vol. 3, p. 152, cited from Louis.

Reflection, however, returned when it was too late. It was recollected, that the son had been of a melancholy turn of mind—that no noise had been heard in the house while the deed was doing—that his clothes were not in the least ruffled—that a single mark only was found from the cord, and which indicated suspension by suicide—and in addition to these, that the dress proper for the dead was found laying on the counter. Voltaire espoused the cause of the injured family, and attracted the eyes of all Europe to this judicial murder. The cause was carried up to the council of state, who, on the 9th of May, 1765, reversed the decree of the parliament, and vindicated the memory of John Calas.*

4. *Of persons found strangled.*

I have already, in the previous section, indicated the difference between this species of murder and hanging; and, indeed, were it not for the sake of regularity, they might be considered together.

In strangulation, strictly considered, the distinction consists in the murdered not being suspended. It is a more common, and probably a more violent, mode of murder than hanging, and we should therefore expect that the mark of the cord, ligature, or whatever else may be used, would be more distinct.

The appearances, on dissection, will not differ materially from those stated in the previous section; but there are some characteristic external appearances. The mark of the ligature will generally form a *horizontal* discoloured circle round the neck, and towards its lower part; and we are to judge by rules already given, whether it was inflicted before or after death. The dislocation of the vertebræ is not to be expected, though there may be fractures of their processes, and in all probability injury to the cartilages of the larynx.†

The same questions are to be solved here as in the former section, *was the deceased really strangled, or was the rope fastened round his neck after he was dead.* This I have endeavoured to answer in a former page, by directing attention to the state of the marks on the neck. There are, however, instances on record, where injuries have been inflicted on bodies strangled, to avert suspicion of the true manner in which they were killed.

Sir Edmundbury Godfrey, an eminent magistrate in Middlesex, (England,) was murdered on the 12th of October, 1677. The manner of his death, as proved by accomplices, on the trial of Green, Berry, and Hill, for his murder, was thus; having enticed him, under a false pretence, to a remote situation, about Somerset-house, a man came behind him, twisted a handkerchief, and threw it about his neck, when four of them threw him down, and strangled him. Not entirely accomplishing their purpose in this way, the person who fixed the handkerchief, twisted his neck round, using violence to the body with his knee. This was on Saturday night. The body was concealed till the Wednesday night following, when about 12 o'clock it was carried away in a sedan chair, and thrown into a ditch. They then passed his own sword through him, and laid his gloves and some other things on the bank, so as to excite the belief that he had committed suicide. In this situation the body was found; and, on examination, it was observed, that an attempt had been made to run him through, but it was prevented by striking on a rib. There was no blood at this wound. The sword, however, passed quite through his body, projecting two hand's breadth beyond his back; and Skillard and Cambridge, the surgeons, deposed, that it went through the heart. When the sword was drawn out, no blood followed, nor was there any about the place. The neck was dislocated, and so flexible that it could be turned from one shoulder to the other. His face, during life, had been always remarkably pale, but it was now much suffused; the eyes were blood-shot, and there was a mark round the neck, an inch broad.*

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* Foderè, vol. 3, p. 167, from the *Causes Célèbres*. See also Grimm's Historical and Literary Mem, &c. (1753 to 1769,) vol. 2, p. 41, 117 and 166.

† Smith, p. 224.

Philip Standsfield was tried and found guilty, in 1688, of the murder of his father, Sir James Standsfield, of New-Milns, in Scotland. This atrocious parricide appears to have been a man of vicious and debauched habits, and on extremely ill-terms with his parent. He cursed him, and repeatedly swore that he would take his life. The father was murdered by strangulation, in his bed-chamber, at the dead of night, and the body was afterwards taken and carried to some water hard by. In the morning, it was discovered lying on the top of the water, which was only five feet deep, and not a running stream, and although Philip was desired to delay the funeral, yet he caused it to be immediately interred. Suspicions were, however, excited, concerning the cause of death, and two surgeons were sent for from Edinburgh, by order of Sir John Dalrymple, the king's advocate, to examine the body. They, (James Murehead and James Craufurd,) had it dug up, and, on inspection, found the following appearances, which I shall give in their own words: "Having, with all possible exactness, viewed the corpse, we observed the face a little swelled, and inclining to a dark reddish colour, some fullness of some capillary veins in the palate of the mouth, towards the uvula, as also a large and conspicuous swelling, about three inches broad, of a dark red or blue colour, from one side of the larynx round backwards to the other side thereof; we observed the jugular veins on both sides the neck very large and distended, and full of blood; there was a large swelling under and betwixt the chin and cartilago scutiformis; there was also a little scratch below the left mandibula, which had rankled the cuticula, and made some little impression on the cutis. Having made incisions from the chin down about the larynx, and cross upon the swelling of the neck, we found a greater laxness and distance, (as we think) than ordinary, betwixt the cartilago scutiformis and os hyoides; we found the tumour on the neck containing bruises, like dark or blackish blood; the jugular, when cut, bled considerably, especially that on the left side.

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* Hargrave's State Trials, vol. 2, p. 759 to 791. Burnet, vol. 2, p. 42. Smith, p. 225. Several persons were afterwards tried, for stating that Sir E. Godfrey had murdered himself; but all the testimony adduced (see that of Lazinby and Hobbs,) only proved the fact of strangulation still more strongly.—See Hargrave's State Trials, vol. 3, p. 505 to 518.

"Having opened his breast, we found the lungs distended to the filling up of their capacities, but free of water; his stomach, liver, &c. were all in good condition; we found no water within the corpse; the corpse had no smell at all; the breast, belly, privy parts, &c. were all well coloured; there was no swelling in his belly, nor any thing but ordinary to be seen on his head."

This report was submitted to the deaconry of surgeons at Edinburgh, and they state, "*that though it is not usual to declare more than matter of fact,*" yet they, in obedience to his lordship's commands and enquiry, whether these symptoms import drowning or strangling, reply, that they indicate external violence, and such as could not be caused by drowning simply. On that part of the report, which details the appearances found on opening the breast and stomach, they observe, that *a body, when drowned, is generally found to have much water in it.* As this was not present in the deceased, as the lungs were distended, but free from water, and as the other circumstances mentioned in the report indicated violence, they decided that there were just grounds to think that he was not drowned.

The college of physicians were also consulted, and answered, that there was sufficient reason to believe that Sir James had been strangled, and not drowned.

Spurway, a person present at the dissection, proved, that when Surgeon Murehead was moving the cap from the head, the eyes opened, and the eyelids were much swoln, and very red.

The defence set up was, that Sir James had drowned himself, and in reply to the argument that no water was found in the body, it was urged, that when a man commits suicide in this way, he will keep his breath, and thus prevent the ingress of the water. Various conjectures were also advanced in the pleadings, to account for the swelling of the neck, but did not prove satisfactory, and the parricide was with great justice condemned and executed.*

I shall adduce another case, to show the facility with which a person may be murdered in this manner. Dr. Clench, a physician in London, was called out of bed by two persons on the night of the 4th of January, 1692, who desired him to visit a friend who was not well. He entered a hackney-coach with them, and drove about several streets in the city for an hour and a quarter. The two individuals then left the coach, and sent the driver on an errand. When the coachman returned, he found Dr. Clench sitting on the bottom of the coach, against the front seat, with his head against the cushion. Thinking him in liquor, he shook him, but obtained no answer. He then called the watch, and they found him strangled by a handkerchief, in which a coal had been placed, and then the coal applied directly over the windpipe.[*] The coachman had heard no noise while driving the carriage.[†]

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* Hargrave's State Trials, vol. 4, p. 283 to 303.

It must, however, not be forgotten, that strangulation is sometimes effected by other means than a cord, ligature, or handkerchief. It may be performed by the hand, and in this instance, instead of a circle round the neck, the discoloration will be partial, the bruises will be of an indistinct form, or the positive marks of fingers may be traced.[‡]

In 1763, a man named Beddingfield was murdered in England, and the charge was laid against his wife and man-servant. The medical testimony was very unsatisfactory, as no dissection had taken place, but, it was proved there were marks about the neck resembling those of fingers. A contradictory account was however given of the number; one surgeon said a thumb and *three* fingers; the other, a thumb and *four fingers;* while another evidence, who also saw the marks at the inquest, spoke of *two* only, "which looked as if the blood was set in the skin."

The defence was, that the deceased had fallen out of bed, and was found lying on the floor on his face, with one hand round his neck.

I am far from thinking that this could have been mistaken, if a proper examination had been made. The discrepancies in the testimony, and the omission of dissection, might however have led to subsequent doubts, had not one of the condemned persons confessed that he had strangled Beddingfield, by seizing his throat with his left hand, while asleep, and that though the deceased struggled violently and made some noise, yet he soon accomplished his purpose.[§]

Sir John Dinely Goodere, in 1741, was forced by violence on board the Ruby ship of war, commanded by his brother, Capt. Goodere, and lying in the port of Bristol. In the night he was strangled by two assassins in the employ of his brother. One of them confessed, that the other fell on Sir John, as he lay in bed, took hold of his throat with his hand (his stock being on) and so strangled him with his stock. They then put a rope, with a noose in it, round his neck, and drew it tight, to insure the certainty of the murder. In accordance with this, Mr. Dudgeon, the surgeon's mate of the Ruby, swore, that there were some marks on his neck, which looked like the scratching of nails, while blood came out of his nose and mouth.[||]

"On opening the bodies of those who are murdered by manual strangulation, the usual appearances of this kind of death may not seem so conclusive as in other cases, from the person making continued resistance, and the functions of respiration and circulation going on in some measure for a longer period than they where interrupted at once, as in the instance of drowning, or the effectual application of a cord."[*]

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[*] There are a caste of robbers in Upper India, who strangle their victim by means of a cummerhand, (a long piece of cloth worn round the waist) in which a knot is cast, and this, from the softness of the cloth, leaves little or no mark; they generally throw the body into a tank, or well, and putridity in that country advances so rapidly, that in 24 or at most 48 hours after death, nothing can be found by which the cause of death could be traced.—EDITOR.

[†] Hargrave's State Trials, vol. 4, p. 495.

[‡] These marks are occasionally very slight. A young officer was strangled in his bed by a soldier. The surgeon of the regiment could find only one small spot, which the murderer afterwards confessed he had produced by violent pressure with his thumb.—Metzger, p. 379.

[§] Smith, p. 227.

[||] Hargrave's State Trials, vol. 6, p. 316 and 331.

In the case of a woman who had been strangled *per manum*, by two men, Littre found the tympanum of the left ear lacerated, and from it flowed about an ounce of blood; the vessels of the brain were unusually turgid; red blood was extravasated in the ventricles, and also on the base of the cranium; the lungs were greatly distended, and their membrane very vascular. Not more than an ounce of blood however was contained in the right ventricle of the heart, and it was fluid and frothy, like that of the lungs.[†]

As to the question, whether *strangulation is the effect of suicide or homicide*, it may be remarked that it is extremely difficult for a person to destroy himself in this way, since his hands lose their strength the moment compression begins. All marks of violence are of course proofs of homicide, and the circular marks itself is *prima facie* evidence, unless contradicted by positive testimony.

Whether it is *possible* that a man has strangled himself, must depend greatly on the appearances, and in particular the position of the body, and the history of his state of mind. The following cases were communicated by Dr. Desgranges, of Lyons, to Foderè, in 1811. A man was found in a hay-loft, strangled by a handkerchief, which had been tightened by a stick. The judicial tribunal consulted the Society of Medicine, whether this was a case of possible suicide. The society replied, *that it was possible;* and Dr. Desgranges observes, that, in a person who is firmly determined to destroy himself, it might be accomplished, by producing several rapid revolutions of the stick, and, in this way, tightening the handkerchief effectually.[‡]

In another case, an old man, in the hospital, used the handle of a pot, as the instrument for tightening the ligature. He was found laying on the bed, with his face turned to the mattrass; the chin was cut by the pieces of the pot; the head was dark-coloured; the face swelled; the lips thickened; and a sanguineous saliva issued from the mouth.[§]

I will only observe on these, that there is a bare possibility of their being instances of suicide, and that all similar instances require strong proofs to obtain our assent to this belief.

5. *Of persons found drowned.*

The present is an intricate, as well as interesting subject. I approach it with diffidence, and can only promise to give a faithful abstract of the current state of knowledge concerning it.

The leading question which every medico-legal case suggests is, *Whether there are any marks that distinguish death by submersion,*

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[*] Smith, p. 229. [†] Foderè, vol. 3, p. 139. Smith, p. 229.

[‡] A navy surgeon, a friend of mine, related to me the case of a Malay, who, on board of a man of war, in the East Indies, had made repeated attempts to commit suicide, and at last succeeded by the means alluded to in the text. He tied a handkerchief round his neck, and with a small stick twisted it several times, and then secured it behind his ear to prevent its untwisting. Jealousy was the cause assigned for the act.—EDITOR.

[§] Foderè, vol. 3, p. 173.

from death previous to submersion? or, in other words, whether a person was thrown when alive, or after death, into the water?

I shall arrange my remarks on this in the following order: first, state the ancient doctrines; and, secondly, those most commonly received at the present day. It will then be proper to comment on the different marks, and show to what qualifications and exceptions they are liable. In doing this, the various theories as to the cause of death from drowning, will require notice, and the whole subject may be then applied by detailing some medico-legal cases.

I. Ambrose Paré has stated, in a few words, the ancient opinions on this subject. He observes, that a surgeon will find the following appearances on the body of a person who has been thrown into the water, while living. The stomach and intestinal canal are filled with water—a glairy mucus issues from the nose, and sometimes there is a bleeding from it—there is a frothy appearance about the mouth, and the extremities of the fingers will be found excoriated, as if, in dying, they had grasped the sand, or some other hard substance. On the contrary, those who have been thrown, when dead, into the water, will have no tumour in the stomach or abdomen, since all the passages to them were closed by the absence of inspiration; the nose and mouth will present none of the appearances mentioned above, nor will there be any excoriation of the fingers.*

These rules were considered orthodox, until the commencement of the eighteenth century; and Deveaux reports several cases which were decided according to them.

II. I believe I shall be correct, in stating that the following marks, laid down by Dr. Marc, are recognized, as correct, by the great body of modern physiologists; with, however, certain qualifications, to be hereafter mentioned.

Signs that a person has been drowned while living. As to the external appearance of the body.

1. The eyes are half open—the pupils much dilated—the skin is remarkable for its paleness, originating in a spasm of the cutaneous vessels—the tongue approaches to the under edges of the lips, and these, as well as the nostrils, are covered with a frothy mucus. Occasionally, when the paleness is wanting, the head will be bloated, the face red, and all the symptoms which denote a determination of blood to the brain, will be present.

2. The excoriation at the ends of the fingers—dirt or sand found under the nails.

As to the appearances on dissection.

3. A greater or less fulness of the blood-vessels of the brain.

4. The right side of the heart and its vessels filled with blood, and the left empty—the lungs dilated and filled with blood.

5. A watery froth, which is sometimes bloody, found in the trachea and bronchiæ.†

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* Quoted by Fodéré, vol. 3, p. 80.

† This appearance I should look upon as doubtful; at least, I have never witnessed it. The irritation of the water, on the rima, effectually closes it while life remains, and there can be no inhalation when that is extinct.—Editor.

6. The diaphragm depressed into the abdomen.

7. The blood in a permanently liquid state, and oozes from the body on the least touch of the scalpel.

8. Water is occasionally found in the stomach.

On the other hand, the *signs that denote death, previous to submersion*, are,

1. The presence of lesions which could not be inflicted under water, such as the marks of ecchymosis, or of a cord around the neck—wounds from fire-arms, or the traces of poisons.

2. The absence of the external characters mentioned above.

3. The absence of water, or foreign substances, in the trachea and stomach.

4. The lungs being in a state of collapse, and not gorged with blood—the abdomen flat, and the diaphragm in a state of natural tension.

5. The blood in a coagulable state.*

III. In proceeding to review the signs now enumerated, we are immediately struck with the variety that is observed in the *external appearance* of the drowned. The countenances of many are pale, while there occur cases in which the face is livid, and the head swelled. To explain this difference, Dr. Desgranges has suggested, that there are distinct modes of death operating in each. One of them he denominates *nervous or syncopal asphyxia*, and it is well illustrated by a case related by Plater. A female, convicted of infanticide, was condemned to be drowned. She fainted on being immersed into the water, and remained there for a quarter of an hour. On being drawn out, she recovered her senses.† This class will be characterized by paleness, in consequence of a spasm of the cutaneous vessels. Fear, or the coldness of the water, or a blow on the head in falling, suspends as it were the vital functions, and throws the nervous system into a state of inaction.

The second is denominated *asphyxia by suffocation*. The drowning person wishes to respire, and, in consequence, a small quantity of water enters the bronchiæ, mixes with the air in them, and forms the frothy mucus so commonly perceived. The lungs are in this case totally unable to perform their functions.‡

Dr. Marc has added a third to these, which he styles *asphyxia from cerebral congestion*, and refers to it such cases as are marked by an apoplectic habit, or where persons fall into the water when in a state of intoxication, or with a full stomach.

In many instances, the two last are, in his opinion, united, and suffocation and apoplexy, according to circumstances, act reciprocally either as the essential or aggravating cause of death.§ It is in these, of course, that we are to look for lividness and swelling of the countenance.

If then we take the above division into consideration, and apply it in medico-legal cases, we have next to enquire whether the external appearances already enumerated, are certain diagnostics of submersion while living. To a limited extent they undoubtedly are, but they are also liable to exceptions. Fothergill has suggested, as a characteristic sign in these cases, that the eyes are found half open, and the pupils very much dilated; but this enlargement of the pupils may have originated from the use of narcotics, and thus death may have preceded drowning. The same remark applies to the appearance of the eyes. Spasmodic diseases, amongst others, will leave them in that state. Again, the paleness may have been the consequence of hæmorrhage or inanition. Froth at the mouth, and projection of the tongue, accompany convulsions and epilepsy; while redness of the visage, and swelling of the head, are the most common signs of death from apoplexy.*

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* Marc, p. 172 to 182.

† Marc, p. 165. This punishment was in compliance with the ancient provisions of the Caroline code. The criminal was put into a sack, and sunk into the water.

‡ Foderè, vol. 2, p. 296.

§ Marc, p. 166, 169.

The excoriation at the ends of the fingers, and the presence of dirt or sand under the nails, were formerly much depended upon, and Ambrose Paré and Bohn, in particular, rely greatly on it, since it indicates, according to them, the last efforts of the *living* individual to save himself from death. Like the last, however, it is rather to be deemed a supplementary than a conclusive proof. A man may fall, during a state of intoxication, into the water, and never make an effort to save himself, or he may be in a state of syncope when drowned. No mark of exertion will then be found†—while, on the other hand, a dead body may, from being thrown from a high place, contract this appearance in rolling over. The depth of water, in these instances, should be noticed, since there may be an extinction of life before coming at the bottom.

While then the external signs are to be strictly noticed, but not greatly relied on, we come next to the more conclusive marks, drawn from the appearances on dissection.

A greater or less fullness of the blood-vessels of the head, together with the fullness of the right side of the heart, and its vessels, has been much relied upon as a sign by several anatomists. Hopffenstock, a physician of Prague, in his dissection of the drowned, observed constantly a great accumulation of blood in the cerebral vessels; the jugular veins; the right auricle and ventricle, and in the pulmonary artery—while, on the contrary, the left side of the heart was completely empty. This led him to suppose, that the stagnation of blood in these vessels was the cause of death, and that this again was occasioned by the cessation of respiration.‡ Mahon states, that he observed the same appearances in his dissections;§ and Kite and Walter have confirmed it by their investigations.

But it may be questioned whether the brain is always thus gorged with blood. Certainly, in those who die from *syncopal asphyxia,* this mark will be far from being a striking one; while, on the contrary, should apoplexy have taken place previous to drowning, we might expect its presence.||

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* Marc, p. 173. † Mahon, vol. 3, p. 3.

‡ Foderè, vol. 3, p.90. § Mahon, vol. 3, p. 30.

|| Goodwin states, as the result of his investigations, that the external surface of the brain is of a darker colour than usual; but the vessels are not turgid with blood, nor

The next mark is, *the presence of a small quantity of water, very frothy, and sometimes coloured with blood in the trachea and bronchiæ.* This has been a subject of great speculation among physiologists, and formerly the water thus found in the lungs and stomach was supposed to be the cause of death. Becker, a German physician, was the first to controvert this opinion. He published a work at the commencement of the eighteenth century, in which he denied that water was always present in these organs, and illustrated his position by several dissections of the human body, as well as by experiments on animals.[*] Some distinguished men, as Littre, Senac, and Petit, embraced his views, although, towards the end of the last century, many physiologists, as Haller, De Haen, and Louis, inclined again to the ancient idea.[†]

There are, however, abundant facts on record, to prove that this frothy mucus is not invariably found. Wepfer and Valdsmidt did not observe it in an animal which they drowned. Evers made a number of experiments at Gottingen, in 1753, on cats, and always found it, but could discover none in the bodies of two persons who were drowned when intoxicated.[‡] Belloc remarks, that he has not found it in cases where persons were undoubtedly drowned while living.[§] And he explains this variety, by suggesting that the last act of the person who falls into the water, may be either inspiration or expiration. If the former, a small quantity of water will reach the lungs, which, mixing with the air contained there, will, by the succeeding process of expiration, form the froth in question. On the contrary, if the last movement be expiration, he does not believe that the water can reach the trachea, and consequently that no froth will be formed.

Foderè suggests, with reference to a previous division, that this mark will not appear in the *syncopal asphyxia*, or *asphyxia from cerebral congestion*, while in *asphyxia from suffocation*, it will be a constant attendant. The inhabitants of Geneva, according to Dr. Fine, have a very bad habit of bathing immediately after a full meal, and in these, according to the above classification, should drowning occur, it might not probably be found.

The most received opinion on this point is, then, the following; the presence of this frothy mucus is not a certain event, nor is it by any means an essential cause of death.[||] As long as there is sufficient

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are there any works of extravasation about them. The right side of the heart is, however, according to him, filled with black blood; while the left ventricle is only about half filled with blood of the same colour.—Enquiry, p. 4 and 5.

[*] This work is published in the Novellæ of Valentini. "J. C. Beckeri Paradoxum-Medico-Legale, *de submersorum morte, sine pota aqua*, 1704," p. 299.—See also a notice of this work in the Phil. Trans. vol. 24, p. 2512. Bohn, of Leipsic, published an essay in 1711, in which he advanced the same opinion.—See Memoirs of Literature, vol. 4, p. 165.

[†] De Haen's Ratio Medendi Continuata, 130, &c. Louis' Memoire sur les Noyés.

[‡] Foderè, vol. 3, p. 93-94.

[§] Belloc, p. 178.

[||] Dr. Goodwyn made an opening into the trachea of a cat, and through this introduced two ounces of water into the lungs. The animal had immediately a difficulty of breathing, and a feeble pulse. But these symptoms soon abated, and it lived several hours afterwards, without much apparent inconvenience. After this, he strangled it, and found two ounces and a half of water in the lungs.—Enquiry, p. 17. Prof. Mayer has lately confirmed this opinion by numerous experiments. Among other results, he mentions, that "animals support a considerable quantity of liquid strength left, the epiglottis will resist the passage of the water, except the slightest quantity, and it is probable that this small quantity is taken in during the last inspiration, mixes with the pulmonary mucus, and produces the frothy appearance.

But it may be asked, whether this mark does not accompany other diseases, and causes of death? There is no doubt but that it has thus been occasionally observed. De Haen has seen it, in the body of a person who was hung, and Marc confirms it by a case which he himself examined.

In those who die from epilepsy, apoplexy, or violent catarrhal affections, it is witnessed, and also in death from irrespirable airs.

These facts lessen our dependence on this sign to a considerable degree, and it will be wholly weakened, if the body has lain for any length of time in the water. Putrefaction soon forms a frothy fluid, strongly resembling the appearance in question.*

As to another difficulty on this point, viz. whether water can enter the lungs after death, there does not seem to exist much doubt. The general opinion is, that the parts will be in such close contact, that none can penetrate. Foderè, however, inclines to the opposite belief, and suggests, that when the body has remained for some time in the water, and putrefaction commences, it will enter upon hydrostatical principles. And again, although the muscles about the larynx and pharynx are ordinarily, in such cases, in a convulsed and constricted state, yet circumstances may occur, to leave them in a relaxed one.† But he refutes his own opinion by a subsequent remark. Water, when introduced after death, can never mix with the air so as to form the peculiar froth in question.‡

The deduction then from this disquisition is, that the presence of the frothy mucus is strong presumptive evidence that the deceased was drowned while living, provided we are satisfied that death has not happened from irrespirable air, epilepsy, apoplexy, &c. The examination must however be made shortly after death, and before putrefaction has commenced. The proof will be greatly strengthened, if we discover, in the bronchiæ or lungs, foreign bodies similar to those contained in the water, such as mud, weeds, &c. Lastly, the glottis should be erect. These are the qualifications that are added by Dr. Marc to this test.§ It

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injected into the lungs, without experiencing mortal symptoms from them. Rabbits can support a dose of four ounces and a half in 24 hours. But these injections should be performed by an opening made into the trachea, for if we inject these fluids by the larynx, they excite the most severe symptoms of suffocation, and the animal soon sinks under it. The suspension of respiration during this irritation of the muscles of the larynx by the injection, is the only cause of death." Again. "The symptoms of suffocation which arise from injections, are not serious when we inject pure water, but they become so when we take thick fluids, for example, all which obstruct the aerial passages, or some chemical solutions, which, destroying the parenchyma of the lungs, prevent the oxydation of the blood, and produce extravasations of blood and inflammation in the lobes of the lungs. The fluids and solutions injected into the lungs, are absorbed more or less quickly, according to their nature and degree of concentration. The absorption is in general very great, but less in young and newly-born animals than in adults."—Edin. Med. and Surg. Journal, vol. 17, p. 469.

* Mahon, vol. 3, p. 5, &c.

† Foderè, vol. 3, p. 98, 100.

‡ Foderè, vol. 3, p. 111. Belloc, p. 180, makes a similar observation.

§ Marc, p. 176.

must however not escape our recollection, that the absence of this frothy mucus is not a conclusive proof that the individual was dead before submersion.

The depression of the diaphragm into the abdomen is considered by Hebenstreit as an essential character. It is wanting, according to him, in those who are drowned after death. Probably the reason of this is, that the last act of breathing is inspiration. The examination with respect to it should always be made early, and the proof should not be deemed of much value, if inflation of the lungs has been used in endeavouring to restore life.[*]

The *liquidity of the blood* was formerly greatly insisted upon, as a most important proof of death by drowning. And this is observed, even in the vessels which enter the bones. If the pericranium be separated, and the blood be taken up with a sponge, it will immediately appear in dots along the surface of the bone.[†] But, (as we have already stated,) this phænomenon occurs in persons found dead from noxious inhalations, and it is a consequence of poisoning by opium. Its diagnostic character is thus affected, and Mahon indeed denies its invariable appearance, and observes, that, in some cases, he has found the blood coagulated. It is evidently not a sign deserving of much consideration.[‡]

As to the presence of *water in the stomach*, we may remark, that it is an accidental circumstance, and in no way connected, as was once supposed, with the cause of death. Goodwyn and Kite have proved, by their experiments, that a quantity may be swallowed during the struggles of a drowning person, but there are also cases on record, where none was found.

Senac illustrated this subject nearly a hundred years ago, by detailing the method then used in Paris for torturing criminals, and under which, the subject occasionally died. The mouth being forcibly kept open with a wedge, and the nostrils closed, a great quantity of water was poured into the person's throat. Respiration was thus prevented, while the irritation of the trachea, in resisting the access of fluid, caused faintings, convulsions, violent agitation of the respiratory organs, rupture of the pulmonary vessels, spitting of blood, and death, but *very little water entered either into the lungs or the stomach* of these unfortunate persons. On dissection, however, the usual lesions observed in death from submersion were apparent.[§]

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[*] Marc, p. 177. Foderè, vol. 3, p. 103. The former intimates a suspicion that this sign may also occur in death from noxious inhalations.

[†] Marc, p. 179.

[‡] Marc proposes to identify this appearance by the following marks:—In death from irrespirable gas, it will be accompanied with a "*flegmasie pulmonaire plus ou moins légère, qui quelquefois s'étend jusqu' au bas ventre;*" and after poisoning, there is an *inflammation more or less intense in the stomach and alimentary canal.* Both are characterized by a *very rapid decomposition.* In death from drowning, the above appearances will be wanting, and putrefaction does not come on so rapidly.—Marc, p. 180.

[§] Smith, p. 210. It was formerly thought, that if no water was found in the stomach, or bronchiæ, death could not have been occasioned by drowning.—See the subsequent notice of the trial of Spencer Cowper.

The common people, who, in all countries, inherit the cast-off prejudices and opinions of their betters, are still of the same opinion; and, deeming water in the stomach and lungs the symptom most to be dreaded in cases of drowning, the first indication

While then it is possible that water may occasionally be found in the stomachs of those who have been drowned, it becomes a question of some interest, whether it can enter after death. Experiments, so far as they have yet proceeded, are decidedly opposed to this. Goodwyn and Kite never found any in the *intestines* of animals; and latterly Dr. Fine, of Geneva, has ascertained that it cannot be introduced into the stomachs of the dead, except by passing an elastic sound into the œsophagus. The sides of that canal, when in a state of inaction, appear to be in close contact.*

From the remarks which have now been made, it is obvious, that no single proof taken separately is perfectly satisfactory, and that several must be united in order to arrive at a just conclusion. The presence of frothy mucus in the trachea, is undoubtedly the sign of the greatest importance.

It is not necessary, after what has been already said, to enter into a disquisition on the cause of death by drowning. Opinions have varied greatly at different times, but the received doctrine at present is, that the extinction of life is caused by the stoppage of respiration, and the exclusion of atmospheric air from the lungs. Dr. Cullen seems to have been among the first who promulgated this belief, and it has been fully sanctioned by subsequent experiments.†

As to the marks of violence, which may be found on the bodies of the drowned, they are with great propriety divided by Foderè into three classes.

1. Those which are totally independent of any connection with the circumstance of drowning. Of this nature, are the usual signs of poisoning—a regularly-formed ecchymosis around the neck, indicative of strangling, or wounds inflicted by fire-arms, or cutting instruments. All these lesions have an essentially distinct character, which cannot be mistaken. And hence the evident importance of examining all bodies drawn from the water. It was by pursuing such an investigation, that Deveaux discovered, under the breast of a woman, a wound which had penetrated to her heart.

2. There are marks of violence which may have resulted either from accidents attending submersion, or from previous homicide, and these are unequal, irregular wounds, which do not penetrate far into the body—contusions, fractures, and luxations. In all such instances, ascertain, if possible, the height from which the person has fallen, and

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of cure, therefore, when such an accident occurs, must be to remove it as speedily as possible. Accordingly, when a man is found drowned, the first process adopted is to roll him about in a barrel, to dislodge the fluid, which they look upon as the origo mali, from all its creeks and corners, and then to hang them up by the heels to empty it out, as if the human frame were as simple in its construction as a bucket. The Humane Society, some years ago, did a good deal of mischief, by giving their sanction, in a pamphlet, on the means of restoring suspended animation, to the antiquated processes of throwing tobacco-smoke up the rectum, &c.—Editor.

* Marc, p. 160. We should recollect, in disputed cases, that the drowned person may have drank some water immediately previous to submersion. Compare this with the fluid in which he is found.

† See Letter to Lord Cathcart, by William Cullen, M. D. Edin. 1784, p. 6.

the resistance he may have encountered.[*] The rapidity of the current, and the sharpness of the banks, may also have caused wounds. The obstacles which might have been encountered should also be noticed. Dr. Fine remarks, that the rapidity of the Rhone, and the numerous mills erected on its banks, often produce most shocking wounds on the bodies of those which are driven against the stakes in the stream, or are drawn into the machinery.[†]

3. Lastly, there may be lesions received after death. These are to be determined by the rules laid down in the section on medico-legal dissection. The progress of putrefaction deserves particular attention in this case.[‡]

Before proceeding to illustrate this subject by a few examples, it is proper to mention one or two circumstances which may become objects of enquiry. The *buoyancy* of bodies in the water has given rise to considerable discussion, and facts directly opposite to each other have been adduced. There is no doubt, however, that a person, whether dead or alive, when first thrown into the water, will sink, unless buoyed up by external aid; but after the process of putrefaction has occasioned the evolution of gaseous matter, to render the body specifically lighter than the water, it will rise to the surface; and it is on this principle that bodies committed to the deep have generally weights affixed to them.

It is, however, possible that the body may float at first, when its cavities have been previously filled with air; and it is also an opinion, that deep water is more favourable for this than shallow. These, however, are circumstances of minor importance.[§] There is more consequence attached to the enquiry, *how long a body has lain in the water.* There is no mode by which this can be accurately ascertained, except that of circumstantial calculation, and the general facts which we mentioned when noticing the subject of putrefaction. It is of great importance, however, to recollect that the animal body, by laying under water, becomes converted into a fatty substance termed *adipocire*, and which in appearance resembles spermaceti.[||] Water in any situation will produce this change, although running water has been found to do it more rapidly. The question, how long a time is necessary to cause this change, has been made the subject of legal enquiry.[¶]

"At the Lent assizes held at Warwick, in the year 1805, the following cause came before the court. A gentleman, who was insolvent, left his own house, with the intention (as was presumed from his recent conduct and conversation) of destroying himself. Five weeks and four days after that period, his body was found floating down a river. The face was disfigured by putrefaction, and the hair separated from the scalp by the slightest pull: but the other parts of the body were firm and white, without any putrefactive appearance. The clothes were unaltered, but the linen was exceedingly rotten. On examining the body, it was found that several parts of it were converted into adipocire.

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[*] "A few years ago, a man who had leaped from each of the then three bridges into the Thames with impunity, undertook to repeat the exploit for a wager. Having jumped from London-bridge, he sunk, and was drowned. When the body was found, it appeared that he had gone down with the arms in the horizontal, instead of the perpendicular posture; in consequence of which, both of them were dislocated by the fall upon the water."—Smith, p. 214.

[†] Marc, p. 183. [‡] Foderé, vol. 3, p. 112 to 115. [§] Smith, p. 211-12.

[||] See Dr. Gibbes' papers on Adipocire, in Phil. Trans. vol. 84, p. 169; vol. 85, p. 239.

[¶] This appearance is often to be found in the macerating tub of a dissecting-room, where there is but little water, and that both stagnant and seldom changed; but the process of its formation requires a much longer time to effect than elsewhere.—Edit.

A commission of bankruptcy having been taken out against the deceased a few days after he left home, it became an important question to the interest of his family, to ascertain whether or not he was living at that period. From the changes which the body had sustained, it was presumed that he had drowned himself on the day he left home; and, to corroborate this presumption, the evidence of Dr. Gibbes, of Bath, was requested, who, from his experiments on this subject, was better acquainted with it than any other person. He stated, on the trial, that he had procured a small quantity of this fatty substance, by immersing the muscular parts of animals in water for a month, and that it requires five or six weeks to make it in any large quantity. Upon this evidence, the jury were of opinion that the deceased was not alive at the time the commission was taken out, and the bankruptcy was accordingly superseded."*

IV. Spencer Cowper, Esq. a member of the English bar, and three other individuals, were tried at the Hertford Assizes, in 1699, for the murder of Mrs. Sarah Stout. Mr. Cowper came to Hertford on Monday, the 13th of March, and shortly after visited Mrs. Stout, who lived with her mother, of the same name. He dined with them, and staid till four in the afternoon. When he went away, he promised to return and lodge there that night. Accordingly, at nine o'clock he arrived, eat some supper, and then engaged in conversation with Mrs. Stout, the daughter. They were alone in the room, when she called a servant, and desired her to make a fire in his chamber, and to warm his bed. The direction was attended to, and in about a quarter of an hour the servant heard the door shut, as if some one was going out. She remained above about a quarter of an hour longer, and then came down into the room. Mr. Cowper and Mrs. Stout were both gone, and the next morning she was found dead, and *floating* on the water. Its depth was about five feet, and her body was about five or six inches under it, although some of her clothes were on its surface. Her eyes were open, and some little froth issued from her mouth and nostrils. The body was not tumified, nor were any bruises observed. This is the testimony of the individuals who took the body out of the water.

Mr. Dimsdale, a surgeon, was sent for by the mother to view the body. He found both sides of the neck swelled and black, and the skin between her breasts, up towards the collar-bone, was also dark-coloured. The left wrist was slightly bruised. There was, however, no circular mark round the neck. It is to be regretted that this investigation proceeded no farther.

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* Male, p. 239-240.

On the 28th of April, six weeks after the death of Mrs. Stout, her body was disinterred for the purpose of inspection. The medical witnesses stated, that they found the head and neck so much putrefied, that no opinion could be formed respecting their appearance. The stomach and intestines were, however, in a sound state, as were also the lungs. Neither of them was putrefied, and, on making incisions into them, no water could be discovered.

Drs. Coatsworth, Nailor, Burnet, and Woodhouse, with Mr. Babington, a surgeon, deposed, that when a person is drowned, water will be taken into the stomach and lungs; and, as none was found in this case, they were of opinion that she came to her death by some other means.

The above is an abstract of the testimony on the part of the crown. On the part of Mr. Cowper, it was first attempted to be shown, that the peculiar position of the body was owing to its laying sideways against some stakes in the river. These prevented its complete immersion under water; and a witness also mentioned, that, in drawing the body out of the water, one of the arms rubbed against the stakes, and thus probably produced the injury observed on it.

Drs. Sloane, Garth, Morley, Wollaston, and Crell, together with William Cowper, the celebrated anatomist, appeared as witnesses for the prisoner. They were all asked concerning the circumstance of no water being found in the body, and whether this disproved the probability of drowning. Dr. Sloane considered it altogether an accidental appearance in the stomach, and not necessarily present in such cases.

The others advanced similar opinions. As to the fluid in the lungs, the answers were not very definite; but it was insinuated by some, that the six weeks burial might have dissipated whatever was taken in.*

During the trial, it was a subject of keen enquiry, whether dead bodies float or sink when thrown into the water. Seamen were summoned to depose on this point, and they testified that weights were fastened in order to produce their descent. The explanation of Dr. Garth is, however, perfectly satisfactory on this point. It is the same which is mentioned in a former page. Weights are added to prevent the buoyancy when putrefaction commences. In answer to a question from the judge, (Baron Hatsell,) Dr. Garth remarked, that the body of a strangled person might possibly float, on account of the included air. In this instance, however, there was no proof of such a cause of death.

Dr. Crell insisted much on the presence of the frothy mucus about the mouth and nostrils, as a proof that Mrs. Stout had been drowned.

The coroner's jury had returned a verdict of *non compos mentis*, and Mr. Cowper, on the trial, attempted to prove a previous melancholy state of mind. This, of course, was for the purpose of rendering it probable that suicide had been committed.

These were the leading medico-legal facts and opinions elicited on the trial, and the jury, after remaining out about half an hour, brought in a verdict of not guilty.[*]

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* Dr. Morley suggested, that if the female intended to destroy herself, she might, by keeping her breath, only take in a very small quantity of water.

A case resembling the above, in several particulars, has happened in this state.

Levi Weeks was, on the 31st of March, 1800, put upon his trial, before the court of oyer and terminer, at New-York, for the murder of Gulielma Sands. The principal circumstances were as follow:—The deceased and the prisoner lodged in the house of Mr. Ring, who was a distant relative of the former. She received attentions from the prisoner, and told Mrs. Ring that she was to be married to him on Sunday, the 22d of December, 1799. When the evening arrived, she dressed herself, and came down into the lower room, where the prisoner was. Shortly after, she again went up-stairs, whither Mrs. Ring followed her, saw her put on her hat and shawl, and take her muff in her hand. While in this state of preparation, Mrs. Ring came down-stairs into the room, and found her husband and Levi sitting together. The latter instantly took his hat and went out into the entry, and the moment the door opened, Mrs. Ring heard a walking on the stairs, and directly a whispering at the door. She soon heard them walking along, and presently the front door opened, and the latch fell. The time she accurately fixed at about ten minutes after eight. Weeks returned to his lodgings at Ring's at ten o'clock. Gulielma's body was found in the Manhattan well, on the 2d of January, 1800.

As to the circumstantial evidence, I will only add the following. It was proved by a witness, that Weeks had spent the evening with him from half-past eight until ten; and again it was testified, that it took fifteen minutes to walk from Ring's to the well.

The medico-legal testimony was of the following import. The body was carefully drawn up, so as not to touch either side of the well. Her hat, handkerchief, and shoes were gone, and her clothes torn. On the right hand there was something like a bruise, and there were scratches of sand upon her skin, some of which was knocked off, and seemed to have been driven forward. The right foot was bare, and somewhat scratched on its upper part, as if she had been dragged on the ground. Her countenance was flushed, and her arms and neck very limber. Drs. Prince and Mackintosh examined the body before the coroner's jury, on the 3d January. It was ascertained that she was not pregnant. The scarf-skin of the face was scratched as if with gravel, and there was a bruise on the knee. There was a livid spot on the breast, but none on the neck. In the body, a small quantity of water was discovered. Both these gentlemen deposed, that, in their opinion, all the appearances could be accounted for on the supposition of her having been drowned.

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[*] Hargrave's State Trials, vol. 5, p. 193 to 231. This case gave rise to several bitter pamphlets, in which the whole course of testimony was reviewed, and the characters of Mrs. Stout and Mr. Cowper were treated with little mercy.—See vol. 8, p. 485 to 512. The opponent of Mr. Cowper accuses him or his accomplices, in broad terms, of having felled her with a blow under the ear, and then strangling her with his hand. Such an opinion is however hardly tenable, as Dimsdale and Camlin both stated, that the stagnation of blood which was present did not materially differ from what is usually observed in the drowned

Dr. Hosack saw the body on the day it was interred. He was struck with the unusual redness of the countenance, and upon looking at the neck, observed three or four dark-coloured spots, of an irregular shape, but not in an exact line. The largest were about an inch and an half, and the smallest about three-quarters of an inch. He was decidedly of opinion that these were marks of violence done to the neck, and did not conceive it possible that they could have been committed on one's own person. Other witnesses had also observed these spots on the neck.

Towards the conclusion of the trial, Dr. Hosack was again called, and asked whether there was any explanation by which the medical testimony, apparently so discordant, could be reconciled. He replied, that it might, in either of two ways. First, the spots were probably not so visible, when the body was first taken out of the water, as after it had been exposed to the air for some days. The gradual progress of putrefaction might have developed this appearance in the injured part. Secondly, when she was first taken out of the well, it was generally supposed that the neck and collar-bone were broken. As Dr. H. did not see her until the day of interment, it is possible that the frequent turning and bending of the head, and the repeated examinations of the neck, to ascertain the injury done to the collar-bone, might have produced the spots in question, and as the body had been dead for several days, a little violence might have produced a rupture of the cutaneous vessels, and a consequent effusion under the skin.

The prisoner was acquitted.[*]

I cannot avoid venturing a single remark on this case. The prisoner was doubtless innocent, but there are strong proofs to my mind, that the deceased suffered violence, previous to falling or being thrown into the well. The weather was undoubtedly cold, (it was during the holidays,) and the progress of putrefaction, during immersion, must unquestionably have been very slow.[†] The coroner's jury viewed the body on the day after it was drawn up. Dr. Hosack, and other witnesses, sometime thereafter. Is it not probable that exposure to the air developed these marks of injury, and do not these marks indicate strangulation previous to immersion?

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[*] Report of the trial of Levi Weeks, &c. taken in short-hand by the clerk of the court, (Wm. Coleman, Esq) 8vo. N. York, 1800.—In the Causes Célèbres, par Mejan, vol. 5, p. 127, a case is related, of an individual taken from the water, around whose body a bag containing several large stones was suspended. Distinct marks of compression were observed in the neck, and on dissecting through the skin, blood was found effused in situations corresponding to the external ecchymosis. One of the cervical vertebræ was luxated. The accusation was, that he had been strangled previous to the immersion; while the defence set up rested on various proofs of previous insanity; and it was insinuated that the luxation might have originated from the fall into the well. The jury (Feb. 12, 1808,) acquitted the *persons accused*, but certainly no proofs need be stronger to determine the fact of murder previous to submersion.

[†] On the 19th of Jan. 1810, the Hon. Mr. Eden, son of Lord Auckland, was missing; and, in March following, his body was found in the Thames. Mr. Holt, surgeon, gave his opinion to the coroner's jury, that, at this season of the year, a body *might be a month or five weeks in the water, without becoming putrid.*—Edin. Ann. Reg. vol. 3, part 2, p. 42.

There is a second question belonging to this subject, which is no less intricate than the first. *Was the drowning the effect of accident, of suicide, or of homicide?* I can offer but a few observations on it.

We should enquire particularly as to the situation in which the body is found—notice whether the stream is rapid or still water, and whether its banks are precipitous or sliding. Ascertain whether the individual has laboured under near-sightedness, vertigo, or symptoms of insanity. The bruises on the body should be examined, and a minute dissection be made. We should, however, recollect, that the person may have precipitated himself into the water, and struck against a stone or other hard substance, and the body may have thus been wounded.* In other cases, accidental circumstances may clear up the subject, as the marks of footsteps on the margin of the water, and substances found grasped in the hands of the deceased, that have evidently been seized while making resistance.†

It is an opinion with some writers, that less water is found in the lungs of suicides than in those who are drowned by accident, or wilfully; but this is evidently uncertain and unfounded.

In March, 1806, a young woman at Little Sheffield, in Yorkshire, made away with herself, by breaking a hole in the ice upon a pond, and thrusting her head in, while the rest of the body remained out. This situation repelled the idea either of force or of accident.‡

In 1776, a young man, named Paulet, of a violent and gloomy temper, was found dead at the bottom of a well. Strong suspicions attached to two individuals. The medical reporters stated that they found sand under the nails of his hands; a circular mark on his ankle-bones, external contusions on the head, and particularly above the left superciliary ridge, and some cuts on the top of the scalp. On opening the thorax, the whole extent of the trachea down to the lungs was found filled with frothy mucus, and the stomach was half full of a whitish water. They considered these as marks of death by drowning. It was proved that the well was so surrounded by houses, that the slightest noise at it would have been immediately heard, and it was also constructed with sharp and heavy stones. The marks on the ankle-bones were alone of a doubtful nature, but, as Paulet had been melancholy, and refused sustenance for several days, and every other circumstance could be satisfactorily explained, the parliament of Toulouse liberated the accused, and agreed that suicide had been committed.§

One would imagine, says Dr. Smith, that if a person be taken out of the water, tied hand and foot, there need be no hesitation about inferring that he had been forced into that situation; yet a probable instance, to the contrary, happened lately in London.

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* Male, p. 286.

† "In the case of Mr. Taylor, aged 20, who was murdered at Hornsey, in Dec. 1818, marks of footsteps, deep in the ground, were discovered near the New River; and, on taking out the body, the hands were found clenched, and contained grass, which he had seized from the side of the water."—Smith, p. 215.

‡ Smith, p. 275. § Foderè, vol. 3, p. 127, from the *Causes Célèbres*.

In June, 1816, the body of a gauging instrument-maker, who had been missing for some days from his home, was discovered floating down the Thames. On being taken out, his wrists were found tied together and made fast to his knees, which were in like manner secured to each other. He had been in a state of mental derangement for two years. The cord with which he had tied himself was recognized as one that had hung from the ceiling over his bed, and by which he used to raise himself up, as he had been confined to bed for some weeks. He was a good swimmer, and it was presumed he had taken the precaution to prevent himself from employing that power. The verdict in this case was "found drowned."*

6. *Of persons found smothered.*

There is but little to be said concerning this species of suffocation, and I introduce it only because I would not omit a notice of any cause of death.

Smothering is the covering of the mouth and nostrils in any way, so as to prevent the free ingress and egress of air. It happens most frequently with children, either as an accident or a crime—and, in the former case, from *overlaying* them, as it is called. This occurs by a pillow, bolster, or bed-clothes, coming in contact with their face in such a manner that their struggles cannot remove it.

Adults, in a state of intoxication, or debility, may also be destroyed by getting into a position which prevents the transit of air to the lungs, and then being unable to extricate themselves. It will seldom be used as an instrument of homicide, since a moderate degree of resistance can generally prevent its effectual application.

Death, in these cases, is the direct consequence of the passage of the blood through the lungs being prevented, and we must, of course, expect to find correspondent proofs on dissection. But marks of external violence will not generally be perceived.

Dr. Smith also adverts to a mode of suicide, said to be practised by negroes, which is, that of doubling back the tongue and swallowing it down into the fauces so low, as completely to choke the individual. This is certainly an extraordinary way of ending life.

In death by smothering, circumstantial evidence must be the principal, if not the only means of ascertaining whether the event has been produced by crime or accident. Tumours pressing on the organs of respiration, or foreign bodies found in the trachea or œsophagus, are of course indications of accidental death.†

7. *Of persons found dead from wounds.*

The general course of investigation, in cases of this nature, has been laid down in the section on medico-legal dissection, and we have only to consider the important question, whether the *wounds are the result of suicide, of accident, or of homicide.*

I must preface my remarks by observing, that in legal medicine the term *wound*, is used in a much more comprehensive sense than in surgery. In the latter, it means a solution of continuity; in the former, injuries of every kind that affect either the hard or the soft parts, and accordingly under it are comprehended bruises, contusions, fractures, luxations, &c.

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* Smith, p. 276.

† Ibid. p. 229 to 232. Foderé, vol. 3, p. 177.

The preliminary object necessary in these cases, is to enquire into the appearances on the body, and to ascertain whether they belong to ecchymosis, or sugillation. The distinction between these has already been stated. We should then pay great attention to the following circumstances: the situation in which the wounded body is found—the position of its members, and the state of its dress—the expression of countenance—the marks of violence, if any be present on the body—the redness or suffusion of the face. This last is important, as it may indicate violence, in order to stop the cries of the individual. The quantity of blood on the ground, or on the clothes, should be noticed, and, in particular, the nature of the wound, its depth and direction. In a case of supposed suicide, by means of a knife, or pistol, the course of the wound should be examined, whether it be upwards or downwards; and the length of the arm should be compared with the direction of the injury. Ascertain whether the right or left arm has been used, and as the former is most commonly employed, the direction should correspond with it, and be from right to left.

When a wound is alleged to have been committed by accident, we may enquire into the probability of this, by comparing the stature of the body with the person who caused the accident, and thus ascertain whether the wound could have been received in its existing direction. The place where the accident has happened, and a comparison of the instrument used with the injury inflicted, may also give useful light.

When a person is found dead at the foot of a precipice, or appears to have fallen from any height, we should naturally expect that fractures, irregular wounds, and contusions, would be present.

Madmen and suicides, it must be remembered, often inflict the most painful and extraordinary wounds on themselves. In suspected cases, we should ascertain the previous history of the deceased, his state of mind, and worldly situation. The countenance should also be noticed. In suicides, it is usually haggard, the eyes are sunk; and this physiognomy continues while a spark of vitality remains in the body. Those, on the contrary, who are the victims of assassination, have a degree of paleness and fear imprinted on their visage.*

These directions, though they may appear minute, are, notwithstanding, important, in consequence of the difficulty of the subject, and the fact that there is scarcely any description of wound which may not be inflicted by an individual on himself. Some, however, may be excepted, as when a person has been wounded by a small and sharp-pointed instrument in the spinal marrow, and generally indeed all wounds from behind.

Fire-arms are frequently used as an instrument of death, and here some inference may be drawn from the nature of the wound. If the ball has passed through the body, it is probable that the murderer was near, or that the individual inflicted it on himself. We cannot, however, rest much on this fact. The direction is of more importance: "It may be taken for granted," says Dr. Smith, "that if the weapon has been introduced into the deceased's mouth, and there discharged, it has not been done by another."

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* Foderè, vol. 3, p. 181 to 188.

Collateral circumstances will also throw some light. Two cases have lately happened, the one in England, and the other in France, where the wadding was examined, and discovered to have been torn from paper found in the possession of the murderer.[*] Again, a man was found shot, and his own pistol lay near him, from which circumstance, (and no person having been seen to enter or leave the house of the deceased,) it was concluded that he had destroyed himself; but on examining the ball by which he had been killed, it was found too large ever to have entered that pistol: in consequence of which discovery, suspicion fell upon the real murderers.[†] Authors have also mentioned the discoloration of the fingers from the combustion of the powder in the pan, as a mark of suicide, and it is certainly an important sign, but a crafty assassin might also have recourse to it.[‡]

A few cases will form the best commentary on the remarks now made.

On the 8th of February, 1792, S. D. aged about thirty years, and of a robust constitution, became intoxicated at an inn near Morges in Switzerland, and in a room heated very warm by a German stove. At eleven o'clock at night, he left this place quite drunk, in order to return home, which was at the distance of half a league. The weather was cold, and the ground covered with snow. The next morning this man was found dead at the side of a ditch, within a small distance from his dwelling. A report soon circulated that he had been assassinated, and a medical man, who saw the body, asserted the certainty of it. The supposed murderer was already pointed out, when Dr. Desgranges, who then resided at Morges, was ordered to inspect the body.

No traces of injury were found, nor indeed any contusions, until in turning the head from the left to the right side, an oblique wound, about three-quarters of an inch externally, was discovered, situated below the under-jaw, and nearly at the top of the larynx. On introducing the little finger into this aperture, its size internally was found greater than its external appearance indicated. Its depth was about one inch, and extended to the œsophagus and top of the trachea. The clothes of the deceased were stained with blood, as was also the snow on which he lay.

As the wound which presented itself did not resemble any inflicted by ordinary instruments, Dr. Desgranges was led to the opinion, that the injury was caused by a kind of auger which the deceased had taken with him from the tavern, and which he had held under his arm, with the handle backwards. This was found laying at the side of the man, covered with clotted blood. The truth of the conjecture was confirmed by opening the wound, and putting the auger into it, when it was found to apply completely. On further dissection, it was ascertained that the left carotid had been wounded, and that hence the immediate cause of death had been the hemorrhage from it. These facts seemed to decide the question as to its being an accident, and it was also supposed, that, in endeavouring to remove the auger on which he had fallen, he had moved it round, and thus made the internal wound larger than the external.[*]

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[*] Smith, p. 280-281. [†] Male, p. 160. [‡] Smith, p. 281.

In 1813, some excitement was caused in England on account of the sudden death of Sellis, a servant of the Duke of Cumberland, and the simultaneous injury received by his Royal Highness. Sir Everard Home published a declaration on this subject, which seems to indicate that Sellis committed suicide, after attempting the life of the Duke. "I visited the Duke," says Sir Everard, "upon his being wounded, and found my way from the great hall to his apartment, by the traces of blood which were left on the passages and staircase. I found him on the bed, still bleeding—his shirt deluged with blood, and the coloured drapery above the pillows sprinkled with blood from a wounded artery, which puts on an appearance that cannot be mistaken by those who have seen it. This could not have happened, had not the head been laying on the pillow when it was wounded. The night ribbon, which was wadded, the cap, scalp, and skull, were obliquely divided, so that the pulsations of the arteries of the brain could be distinguished. While dressing these wounds, a report came that Sellis was dead. I went to his apartment —found the body laying on his side on the bed, without his coat and neckcloth—the throat cut so effectually, that he could not have survived a minute or two. The length and direction of the wound was such as left no doubt of its being given by his own hand: *any struggle would have made it irregular.* He had not even changed his position —his hands lay as they do in a person who has fainted; they had no marks of violence upon them—his coat hung upon a chair, out of the reach of blood from the bed—the sleeve, from the wrist to the shoulder, was sprinkled with *blood quite dry, evidently from a wounded artery,* and from such kind of sprinkling, the arm of the assassin of the Duke of Cumberland could not escape."[†]

Having mentioned a case of accident, and another of probable suicide, I will now state one of homicide. The case was found reported among the papers of Sir John Maynard, an eminent English lawyer, and is stated by him to have occurred in the fourth year of Charles I. It happened in Hertfordshire.

Jane Norkott was found dead in her bed—her throat cut, and the knife sticking in the floor. Two females and a man slept in the adjoining room, and they deposed, that, the night before, she went to bed with her child, her husband being absent, and that no person after that time came into the house. The coroner's jury gave a verdict of *felo de se*. But a suspicion being excited against these individuals, the jury, whose verdict was not yet drawn up in form, desired that she might be taken up; and accordingly, *thirty days* after her death, she was taken up, and the jury charged them with the murder. They were tried at the Hertford assizes, and acquitted; but so much against evidence, that Judge Harvey let fall his opinion, that it were better an appeal were brought, than so foul a murder should escape unpunished. And, accordingly, an appeal was brought by the child against *his father, grandmother, aunt; and her husband Okeman.*

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[*] Foderé, vol. 3, p. 190. The case was communicated by Dr. Desgranges.

[†] Edin. Ann. Register, vol. 6, part 2, p. 19. Smith, p. 284.

The evidence adduced was, "that she lay in a composed manner in her bed—the bed-clothes not at all disturbed, and her child by her in bed. Her throat was cut from ear to ear, and her neck broke. There was no blood in the bed, saving a tincture of blood on the bolster, whereon her head lay, but no substance of blood at all. From the bed's head, there was a stream of blood on the floor, which ran along until it ponded in the bendings of the floor. It was a very great quantity, and there was also another stream of blood on the floor at the bed's foot, which ponded also on the floor to a very great quantity; but no continuance or communication of blood of either of these two places from one to the other, neither upon the bed—so that she bled in two several places; and it was deposed, that in turning up the mat of the bed, there were clots of congealed blood in the straw of the mat underneath. The bloody knife was found in the morning sticking in the floor, a good distance from the bed; but the point of the knife, as it stuck, was towards the bed, and the haft from the bed. Lastly, there was the print of a thumb and four fingers of a left hand.

Sir Nicholas Hyde, chief-justice. How can you know the print of a right hand from that of the left in such a case?—*Witness.* My Lord, it is hard to describe; but if it please the honourable judge to put his left hand upon your left hand, you cannot possibly place your right hand in the same posture; which being done, and appearing so, the defendants had time to make their defence, but gave no evidence to any purpose."

The jury brought in all guilty except Okeman, and they were executed, but made no confession.[*]

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[*] Hargrave's State Trials, vol. 10, appendix No. 2, p. 29. The above, however, are not the only remarkable circumstances in this case. "Because the evidence," says Sir John Maynard, "was so strange, I took exact and particular notice, and it was as follows; An ancient and grave person, *minister to the parish where the fact was committed*, being sworn to give evidence, according to custom, deposed, "That the body being taken up out of the grave, thirty days after the party's death, and lying on the grass; and the four defendants being present, were required each of them to touch the dead body. Okeman's wife fell upon her knees, and prayed God to show tokens of her innocency. The appellant did touch the dead body, whereupon the brow of the dead, which before was of a livid and carrion colour (in terminis, *the verbal expression of the witness.*) began to have a dew, or gentle sweat arise on it, which increased by degrees, till the sweat ran down in drops on the face; the brow

Whether these were the guilty persons or not, it is certainly proved most incontestibly that the female was murdered.

The Earl of Essex was committed to the Tower on the 10th of July, 1683, on a charge of high-treason, and, on the 13th, was found dead in his chamber, with his throat cut. A coroner's jury was summoned, but before they were impannelled, the Earl's body was taken out of the closet where it lay, and stript of its clothes. These were carried away, and the closet washed. And when one of the jury insisted upon seeing his clothes, the coroner was sent for into another room, and, upon his return, told the jury *it was my Lord's body, and not his clothes, they were to sit upon.* Before the jury, two surgeons, Sherwood and Andrews, deposed as to the wound. Sherwood stated, that the asperia arteria and the gullet, with the jugular arteries, were all divided. Andrews said, that the throat was cut from one jugular to the other, and through the windpipe and gullet into the verbetræ of the neck, both jugular veins being divided. The verdict of the coroner's jury

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turned to a lively and fresh colour; and the deceased opened one of her eyes, and shut it again; and this opening of the eye was done three several times. She likewise thrust out the ring or marriage finger three times, and pulled it in again, and the finger dropped blood from it on the grass." *Sir Nicholas Hyde*, chief-justice, seeming to doubt the evidence, asked the witness, Who saw this besides you?—*Witness.* I cannot swear what others saw. But, my Lord, (said he) I do believe the whole company saw it, and if it had been thought a doubt, proof would have been made of it, and many would have attested with me. Then the witness, observing some admiration in the auditors, spake further, "My Lord, I am minister of the parish, and have long known all the parties, but never had occasion of displeasure against any of them, nor had to do with them, or they with me; but as I was minister, the thing was wonderful to me. But I have no interest in the matter, but as called upon to testify the truth, and this I have done." [This witness was a very reverend person, as I guessed, of about seventy years of age. His testimony was delivered gravely and temperately, to the great admiration of the auditory.] Whereupon, applying himself to the chief-justice, he said, "My Lord, my brother here present, is minister of the next parish adjacent, and I am sure saw all done that I have affirmed." Therefore that person was also sworn to give evidence, and did depose in every point—"the sweating of the brow—the change of the colour—thrice opening the eye—the thrice motion of the finger, and drawing it in again." Only the first witness added, that he himself dipped his finger in the blood which came from the dead body, to examine it, and he swore he believed it was blood. I conferred afterwards with Sir Edward Powell, barrister-at-law, and others, who all concurred in the observation. And for myself, if I were upon oath, can depose that these depositions (especially the first witness) are truly reported in substance."—Ibid. p. 29.

In the trial of Standsfield, for the murder of his father, (see p. 287 of this chap.) a similar charge was brought. It is stated, that when the son was assisting in lifting the body of his father into the coffin, it bled afresh, and defiled all his hand. The opposite lawyers observe, that "this is but a superstitious observation, without any ground either in law or reason. Carpeovius says, he has seen a body bleed in the presence of one not guilty, and not bleed when the guilty were present." They assign, with great probability, as the cause of this bleeding, the fact that the surgeons had made an incision about the neck, and that the motion of the body, in removing it, caused the fresh hemorrhage from that part. Hargrave, vol. 4, p. 283.—I will refer those who are curious on this subject, to Metzger, p. 328; and Valentini Novellæ, App. 3. *De stillicidio sanguinis in hominis violenter occisi, cadavere conspicui, an sit sufficiens præsentis homicidæ indicium?*

was in the following words:—That, with a razor, "The Earl of Essex gave himself one mortal wound, cut from one jugular to the other, and by the aspera arteria and the windpipe to the vertebres of the neck, both the jugulars being thoroughly divided: and of this he died."

One Laurence Braddon, shortly after, formed the opinion that the Earl of Essex had been murdered, and, (as he afterwards stated, conceived it to have been accomplished by individuals who were allowed to pass by the earl's keepers. These murderers, he supposed, were set on by the Duke of York, afterwards James II. He was tried for a misdemeanor, in suborning witnesses to prove this, and was found guilty and fined £2000. After the revolution, in 1690, he published a pamphlet, entitled, "*The Earl of Essex's Innocency and Honor vindicated*," which contains some additional particulars.

The closet was about three feet two inches wide, and there was no blood higher than the floor. The instrument itself was a French razor, four inches and a quarter in its blade, and no spill or tongue at the end. Hence it must have been held by the blade, and it would seem difficult to inflict so large a wound with it. A surgeon is stated to have suggested to the coroner's jury, *that the notches in the razor were made by my lord against his neck-bone.* Lord Essex was right-handed, and the razor lay on the left-side. Two witnesses swore that the neck of his cravat was cut in three pieces, and there were five cuts on his right-hand.

Bishop Burnet is of opinion, that the earl committed suicide. He observes, that "when the body was brought home to his own house, and the wound was examined by his own surgeon, he said to me, it was impossible that the wound could be as it was, if given by any hand but his own. For, except he had cast his head back, and stretched up his neck all he could, *the aspera arteria must have been cut.*" Both the jugulars and gullet (he adds) were cut just above the aspera arteria.

The reader will notice the discrepancy between this account, and the statement given under oath by the surgeons before the coroner's jury.

This subject was also agitated for some time before a committee of the house of lords, and several physicians and surgeons, who were examined before them declared, "that they would not positively say that it was impossible for my lord to cut his throat through each jugular vein, the aspera arteria and gullet, to the very neck-bone, and even behind each jugular vein on each side of the neck, (as some judicious surgeons, who had viewed the throat, had reported it to be cut,) but this they would be very positive in, that they never saw any man's throat so cut, which was cut by himself. And they did then further declare, that they did believe, that when any man had cut through one of his jugular veins and the gullet and windpipe, and to the very neck-bone, nature would thereby be so much weakened by the great effusion of blood and animal spirit, that the *felo de se* would not have strength sufficient to cut through and behind the other jugular, as my lord's throat, by surgeons who saw it, was said to be cut."

Bishop Burnet relies on some doubtful expressions used by the earl, as a proof that he intended to destroy himself; but it would certainly seem, from a review of the above facts, that the earl had been murdered.*

I will close this section with a case of death by fire-arms.

C. D., residing in the same house with his sister-in-law, suddenly disappeared. After a course of judicial researches, his body was found buried in a cemetery, wrapped in ten folds of linen, and with his clothes on, covered with blood. In his left side were two round holes, distant about five inches from each other.—The medical examiners reported that one of these penetrated from side to side, so as to take off a part of the right breast, and, on pursuing the dissection, the ball was found to have entered at the last true rib of the left-side, to have passed the stomach, of which it wounded the upper part, and to have pierced the duodenum with a wound five inches long, and finally to have passed out at the first false rib of the left-side. Corresponding holes were found in the clothes and shirt, and they therefore gave it as their opinion, that these wounds had been inflicted by fire-arms, and were the cause of death. On this, the sister-in-law of the deceased, was arrested, as the clandestine burial, together with the wrapping up of the body, led to doubts concerning her innocence.

Mr. Pelletan, and another surgeon, whose name is not mentioned, were consulted on the case. They agreed, that no doubt could exist as to the cause of the death being a wound from a fusee; but they, at the same time, affirmed, that the deceased might have inflicted it, either voluntarily or involuntarily on himself, and that another person could not have done it without being in an ambuscade, with his knee on the ground, and the deceased walking. From these circumstances, they were of opinion, that the sister-in-law was not the murderer, if murder had been committed.

On this decision, I may remark with Foderè, that it seems difficult that a wound, inflicted in this manner, and nearly in a horizontal line, could have been caused by suicide; while, again, the sister-in-law, though not the actual murderer, might, notwithstanding, have been an accessary. She was, however, acquitted.†

8. *Of persons found burnt to death.*

The same circumstances to which we have directed the attention of the examiner in previous sections, are to be noticed in cases of this nature. Dissection, if it be practicable, must not be omitted.

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* The authorities from which I have drawn the above narrative, are:—*The Trial of L. Braddon*, in Hargrave's State Trials, vol. 3, p. 855. *The Earl of Essex's Innocency and Honour vindicated, by L. Braddon.* Ibid. vol. 3, p. 899 to 934. The Republic of Letters, for August, 1735. "*Some passages sent by a person of honour to the author of the Republic,*" &c. Burnet, vol. 2, p. 212 and 284; and Smith, p. 282 and 283. There is also another pamphlet by Braddon, (published in 1725,) reprinted in Howell's State Trials, vol. 9. p. 1229.

† Pelletan, vol. 1, p. 306 to 323. Foderè, vol. 3, p. 199.

There is an instance, related by Foderè, which presents a most instructive lesson. In 1809, a wretch murdered several individuals with an axe, and then set fire to the house. The medical officer did not deem it worth while to examine the bodies, and certified that their death was owing to the fire. Meanwhile an individual was discovered murdered about one hundred paces from the house, and suspicion being excited, the bodies were disinterred. It was found that the flames had only burnt the flesh superficially, and that the marks of the axe were still distinctly visible.[*]

There is one question that may arise, in cases where persons are found burnt to death, which is alike interesting and curious; and that is, *can there be such a thing as* SPONTANEOUS COMBUSTION IN THE HUMAN BODY? Several cases are recorded of this nature, which I shall relate, and leave the reader to form his own opinion concerning their value.[†]

It is stated, in the transactions of the Copenhagen society, that, in 1692, a woman of the lower class, who for three years had used spirituous liquors to such excess that she took no other nourishment, having sat down one evening on a straw-chair to sleep, was consumed in the night-time, so that next morning no part of her was found but the skull, and the extreme joints of the fingers. All the rest of her body was reduced to ashes.[‡]

The Countess Cornelia Bandi, of Cesena, in Italy, aged 62, and in good health, was accustomed to bathe all her body in camphorated spirits of wine. One evening, having experienced a sort of drowsiness, she retired to bed, and her maid remained with her till she fell asleep. Next morning, when the girl entered to wake her mistress, she found nothing but the remains of her body, in the most horrible condition. At the distance of four feet from the bed was a heap of ashes, in which the legs and arms were alone untouched. Between the legs lay the head. The brain, together with half the posterior part of the cranium, and the whole chin, had been consumed; three fingers were found in the state of a coal, and the rest of the body was reduced to ashes, which, when touched, left on the fingers a fat fœtid moisture. A small lamp, which stood on the floor, was covered with ashes, and contained no oil; the tallow of two candles was melted on a table, but the wicks still remained, and the feet of the candlesticks were covered with moisture. The bed was not deranged, the bed-clothes and coverlid were raised up, and thrown on one side, as is the case when a person gets up. The furniture and tapestry were covered with a moist kind of soot, of the colour of ashes, which had penetrated into the drawers, and dirtied the linen.

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[*] Foderè, vol. 3, p. 18.

[†] Probably the term *spontaneous* is not strictly accurate, since we always find some burning body mentioned, as exciting the phænomenon in question. I have adopted it, because of its general use, and also because the term *human combustion*, which it has been proposed to substitute in its place, appears too indefinite.

[‡] See an article in the Emporium of Arts and Sciences, edited by J. R Coxe, M. D. vol. 1, p. 161, entitled, "*On the Combustion of the Human Body, produced by the long and immoderate Use of Spirituous Liquors*, by Pierre Aime Lair." This essay was originally written in French. In my further quotations from it, I shall, for brevity, use the word *Lair* only.

This case is related by Bianchini, and confirmed by other writers.*

Grace Pett, the wife of a fishmonger, of the parish of St. Clement, Ipswich, aged about sixty, had contracted a habit, which she continued for several years, of coming down from her bed-room every night, half dressed, to smoke a pipe. On the 9th of April, 1744, she got up from bed as usual. Her daughter, who slept with her, did not perceive that she was absent till next morning, when she awoke. Soon after this, she put on her clothes, and going down into the kitchen, found her mother stretched out on her right-side, with her head near the grate. The body was extended on the hearth, with the legs on the deal floor, and it had the appearance of a log of wood consumed by a fire, without apparent flame. On beholding the spectacle, the girl ran in great haste, and poured over her mother's body some water, to extinguish the fire. The fœtid odour and smoke which exhaled from the body, almost suffocated some of the neighbours who had hastened to the girl's assistance. The trunk was in some measure incinerated, and resembled a heap of coals covered with white ashes. The head, the arms, the legs and the thighs, had also participated in the burning. This woman, it is said, had drank a large quantity of spirituous liquor, in consequence of being overjoyed to hear that one of her daughters had returned from Gibraltar. There was no fire in the grate, and the candle had burnt entirely out in the socket of the candlestick, which was close to her. There were also found near the consumed body, the clothes of a child, and a paper screen, which had sustained no injury from the fire. Her dress consisted of a cotton gown.†

Le Cat relates the following case, which was communicated to him by M. Boinneau, curé of Plerguer, near Dol. It occurred in 1749. Madame De Boiseon, eighty years of age, who had drank nothing but spirits for several years, was sitting in her elbow-chair before the fire, while her waiting-maid went out of the room for a few moments. On her return, seeing her mistress on fire, she immediately gave the alarm, and some persons having come to her assistance, one of them endeavoured to extinguish the flames with his hand, but they adhered to it, as if it had been dipped in brandy, or oil on fire. Water was brought and thrown on her, yet the fire appeared more violent, and was not extinguished till the whole flesh had been consumed. Her skeleton, exceedingly black, remained entire in the chair, which was only a little scorched—one leg only, and the two hands, detached themselves from the rest of the bones. It is not known whether her clothes had caught fire by approaching the grate, but she was in the same place in which she sat every day—there was no extraordinary fire, and she had not fallen.[*]

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* *Lair*, p. 162, who quotes the Annual Register for 1763.—See also Phil. Transactions, vol. 43, p. 447.

† Philosophical Transactions, vol. 43, p. 463.

By a letter from Gen. William Shepherd, it appears, that on the 16th of March, 1802, in one of the towns of the state of Massachusetts, the body of an elderly woman disappeared, in the space of about one hour and an half. Part of the family had retired to bed, and the rest were gone abroad. The old woman remained awake to take care of the house. Soon after one of the grand-children came home, and discovered the floor near the hearth to be on fire. An alarm was given—a light brought, and means taken to extinguish it. While these things were doing, some singular appearances were observed on the hearth and contiguous floor. There was a sort of greasy soot and ashes, with remains of a human body, and an unusual smell in the room. All the clothes were consumed. The fire had been small.[†]

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[*] Lair, p. 168.

[†] Coxe's Emporium of Arts, vol. 1, p. 326, who quotes from Tilloch, vol. 14, p. 96. The same case is also mentioned by Foderè, vol. 3, p. 208.—I have cited the cases in the text, not so much with reference to their peculiar features, as their geographical position. There is a case respectively from Denmark, Italy, England, France, and America. Several other instances are on record, to which I refer the reader for further details. They are,

1. Mary Clues, aged fifty, at Coventry, (England) Phil. Trans. vol. 64, p. 340.
2. An anonymous case, by Vicq D'Azyr, of a woman aged fifty years.
3. A case by Henry Bohanser, of a female at Paris.
4. The wife of Sieur Millet, at Rheims, in 1725, related by Le Cat.
5. Mary Jauffret, at Aix in Provence, related by Muraire, a surgeon, in the *Journal de Medicine*.
6. Mademoiselle Thuars, at Caen, in 1782, related by Merille, a surgeon, in the *Journal de Medicine*.
7. Two anonymous cases of females at Caen.

All these are mentioned by Lair.

8. An anonymous case of a female at Paris in 1779. Foderè, vol. 3, p. 207.
9. The priest Bertholi, in 1776, in Italy. This is a very remarkable case, and some particulars mentioned by Battaglia, the surgeon who attended him, may with propriety be added in this place. Bertholi was travelling about the country, and at evening arrived at the house of his brother-in-law. He immediately desired to be shewn to his apartment, and, when brought to it, requested that a handkerchief should be placed between his shirt and shoulders. This was done, and he was left to his devotions. A few minutes had scarcely elapsed, before a noise was heard in his room, and the cries of the priest were particularly distinguished. On entering the room, he was found extended on the floor, and surrounded by a light flame, which receded as they approached, and finally vanished. On the next morning, M. Battaglia was called, and examined the patient. He found the integuments of the right arm almost entirely detached from the flesh, and, between the shoulders and thighs, the integuments were injured. There was a mortification of the right hand, and this, in spite of scarification, rapidly extended itself. The patient complained of burning thirst, and was horribly convulsed; he passed by stool putrid bilious matter, and was exhausted with continual vomiting, accompanied with fever and delirium. On the fourth day, after two hours of comatose insensibility, he expired; and a short time previous to his death, M. Battaglia observed with astonishment, that the body exhaled a most insufferable odour—worms crawled from it on the bed, and the nails had become detached from the left hand.

The account of the patient was, that he felt a stroke like the blow of a cudgel on

Some deductions are drawn from these cases, by Drs. Lair and Marc, which it is proper to mention. 1. The subjects were nearly all females—and they were far advanced in life. The Countess of Cesena was 62, Mary Clues 52, Grace Pett 60, Madame de Boiseon 80, and M. Thuars more than 60. 2. Most of the individuals had for a long time made an immoderate use of spirituous liquors, and they were either very fat or very lean. 3. The combustion occurred accidentally, and often from a slight cause, such as a candle, a coal, or even a spark. 4. The combustion proceeded with great rapidity, but the extremities, such as the feet and the hands, were generally spared by the fire. 5. Water, instead of extinguishing the flames which proceeded from the parts on fire, sometimes gave them more activity. 6. The fire did very little damage, and often did not affect the combustible objects which were in contact with the human body at the moment when it was burning. 7. The combustion of these bodies left, as a residuum, fat fœtid ashes, with an unctuous, stinking, and very penetrating soot. 8. The combustions have occurred at all seasons, and in northern as well as southern countries.*

As to the cause of these phœnomena, two opinions have been promulgated. Lair and others suppose that there is an alkoholic impregnation of the body, and that actual contact with fire is then necessary to produce them; while Maffei, Le Cat, Kopp, and Marc, attributes this combustion to the agency of the electric fluid.†

There is but one instance on record, that appears to have been

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the right hand, and, at the same time, saw a bluish flame attack his shirt, which was immediately reduced to ashes, the wristbands in the mean while remaining totally untouched. The handkerchief between the shoulders and shirt was entire, and free from any trace of burning. His breeches were also uninjured, but though not a hair of his head was burnt, yet his cap was entirely consumed. There was no fire in the room, except that the lamp, which had been full of oil, was now dry, and its wick reduced to a cinder.—Foderè, vol. 8, p. 210. Lon. Med. Repository, vol. 1, p. 338.

10. A female at Paris in 1804, aged 68, related by Dr. Vigné. Foderè, vol. 8, p. 216.

11. A female in France, aged 98, communicated by Dr. Prouteau, in *Leroux's Journal de Medicine.*—New England Journal, vol. 4, p. 194.

12. Mrs. Laire, at Saulieu, in 1808, aged 60 years.—Ballard, p. 414.

13. Ignatius Meyer, aged 48, in the village of Waertelfeld, bailiwick of Schwalenberg, in Germany. This occurred on the 17th of January, 1811. Meyer was a very intemperate man. The parts of the body under the bed-clothes were not affected. This case is related by Dr. Scherf of Detmold.—London Med. Repository, vol. 8, p. 239. New-York Medical Repository, vol. 18, p. 87.

14 and 15. Two cases are said to have lately occurred in France.—Smith, p. 60. They may possibly be Nos. 10 and 11.

If to these we add the five cases mentioned in the text, we shall have at least eighteen cases that are recorded of this extraordinary phænomenon; and there are doubtless several which I have not noticed.

* Lair, p. 171. Foderè, vol. 8, p. 217. Belloc, p. 194.

† A valuable paper on this subject is published in the American Medical Recorder, vol. 5, p. 489, by Thomas D. Mitchell, M.D. The ingenious author supports, in a very satisfactory manner, the opinion, that combustible gases are generated in the system of drunkards, by the decomposition of the alcohol which is continually drank.

made the subject of judicial enquiry, although it is evident that all might lead to suspicion, and even condemnation.

The case is related by Le Cat, and is that of the wife of the Sieur Millet, at Rheims. She got intoxicated every day, and the domestic economy of the house was managed by a handsome young female. This woman was found consumed on the 20th of February, 1725, at the distance of a foot and a half from the hearth in her kitchen. A part of the head only, with a portion of the lower extremities and a few of the vertebræ, had escaped combustion. A foot and a half of the flooring under the body had been consumed, but a kneading-trough and a tub, which were very near the body, sustained no injury. M. Chretien, a surgeon, examined the remains of the body with every juridical formality. Jean Millet, the husband, being interrogated by the judges, declared, that about eight in the evening of the 19th of February, he had retired to rest with his wife, who not being able to sleep, had gone into the kitchen, where he thought she was warming herself; that having fallen asleep, he was awakened about two o'clock by an infectious odour, and that having run to the kitchen, he found the remains of his wife, in the state described in the report of the physicians and surgeons. The judges formed an opinion, that he had conspired with his servant to destroy the wife, and he was condemned to death. On appeal, however, to a higher court, this decree was reversed, and it was pronounced a case of human combustion; but his health and fortune were irreparably destroyed, and he died in a hospital.[*]

The distinction then between these cases, if we allow their possibility (and I cannot well see how we can avoid this) and ordinary combustion, is, that in the latter, if the body be not wholly consumed, there will be redness, blisters, scars, &c. on various parts. The combustion will be incomplete, particularly as to the bones, and it will extend itself more certainly to neighbouring substances—it is evidently also slower in producing its effects.*

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[*] Lair, p. 167. Foderè, vol. 3, p. 205.

The following is the latest, and consequently best-authenticated case on record, After this, it is to be hoped that we shall hear nothing more of the excess of incredulity on this subject, which M. Foderè asserts is the great bar to philosophical discovery in the present age.

Another case, which occurred in the neighbourhood of Bourdeaux, in September 1822, has been related in the last volume of the *Nouveau Journal de Medicine*; but though the particulars were sworn to before a magistrate, our readers will not be at a loss to discover good reasons for doubting its authenticity. A sober healthy blacksmith was returning home in company with a girl one very hot afternoon, when he suddenly felt an acute pain in the right index, and was astonished to behold it burning and smoking. He rubbed it against his thumb to extinguish the flame, but the flames caught both the thumb and middle finger. He then rubbed them on his trowsers, but burnt two holes in them; next, he thrust his hand into his pocket, and set it on fire too; and finally, he happened to touch the fore and middle finger of the left hand, when these caught fire also. In vain did he plunge them into a bucket of water; they continued to burn. In vain did he stick them in the mud; the virtues of the mud were not more potent. At last, a devout female reminded him that the faith saves us; he dipped them in holy water, and the flames were speedily extinguished. Since the well-known story of the priest Bertholi (see Foderè, Med. Leg. III. 210.) this is the only instance of alleged spontaneous combustion, where the sufferer has been seen during life. The most amusing of the whole story is, that the relator doubts none of the circumstances, except the efficacy imparted to the water by its sanctification. —EDITOR.

9. *Of persons found dead from hunger.*

The crime of permitting or causing individuals to die from hunger, is no doubt rare in civilized countries. Instances have however happened, and an account of the appearances observed after death, is therefore proper.

The body is much emaciated, and a fœtid, acrid odour exhales from it, although death may have been very recent. The eyes are red and open. This appearance is uncommon from other causes of death. The tongue and throat are dry, even to aridity, and the stomach and intestines are contracted and empty. This last mark has been repeatedly noticed. Haller dissected the body of a person who destroyed himself by hunger, and found the organs in question entirely empty. Not the least vestige of fæces was to be seen in the intestines. The gall-bladder is puffed with bile, and this fluid is found scattered over the stomach and intestines, so as to tinge them very extensively. The lungs are withered, but all the other organs are generally in a healthy state. The blood-vessels are usually empty.

There is considerable variety as to the rapidity of putrefaction in these cases. With many, it occurs to a high degree, immediately after death, while, with others, it is delayed longer than in ordinary cases.†

We may remark, that several of the signs, as now related, are characteristic and distinct from those occurring from other causes of violent death; and I would particularly refer to the healthy state of particular organs, the peculiar redness of the eyes, the state of the stomach and intestines, and the great secretion of bile.

In 1768, the daughter of a notary at Nevers, in France, aged fifteen, died of an unknown disease. She had been already buried, when it was rumoured abroad that her father had caused her death by hunger in a cellar. The information laid before the judge was of such a nature, that he directed the arrest of the parent, and the disinterment of the body. This was twenty-four hours after the burial. The report of the medical examiners was as follows:

The whole body is extremely emaciated. The skin is very thin, and its colour livid—an unpleasant odour is exhaled—the eyes are open and red—contusions and excoriations appear on various parts of the body—and the anus and vagina are covered with small white worms in great quantity, and these parts, and particularly the first, are much excoriated and dilated. On opening the body, the stomach was seen in a healthy state, containing a wine-glass full of serous, greenish bile—the pylorus was contracted—the duodenum, together with the right side of the ileon and jejunum, was inflamed—the gall-bladder was swelled with bile, and the intestines were entirely empty. The remainder of the viscera, together with those of the thorax and head, were in a healthy state, except that the right lung was a little withered. The report concluded by giving an opinion, that the girl had died in a state of extreme weakness and languor, but it assigned no cause for it.

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* Belloc, p. 195.

† Foderè, vol. 2, p. 276. Ibid. vol. 3, p. 231 to 239. These appearances are confirmed by the observations of Morgagni, Redi, Valsalva, and Haller, as quoted by our author. There is also a case mentioned in the London Med. and Phys. Journal. vol. 15, p. 510, of death from spontaneous abstinence, which occurred under the observation of Dr. Desgenettes at Paris, where the appearances on dissection were nearly precisely similar to those mentioned above, except that the lungs were sound. *The stomach was reduced to a fourth of its natural size. The gall-bladder was distended with bile, and the duodenum, and other smaller intestines, were filled with that fluid.*

Public opinion continued to implicate the parents, and they sought a defender in the celebrated Petit, from whom an answer to the following questions was requested: 1. Whether the facts stated above were sufficient to prove that the child died from hunger? 2. Whether there was any circumstance to indicate that a length of time had elapsed between the death and burial? To both of these, he answered in the negative, and for the following reasons: extreme emaciation is rather a proof of long illness, than of starvation, because it is very common for persons of a tolerable degree of fatness, when they refuse food, to die before they lose much flesh. The emptiness of the intestines was more indicative of colliquative diarrhœa from long disease, than of any other cause. The state of the gall-bladder proved, (in Petit's opinion) nothing on one side or the other, nor did the excoriations, while the natural state of the stomach was an argument against death by famine, since, in such cases, that organ is observed to be much contracted. Finally, the worms might have been present in the parts for some time before death, nor was the smell of the body by any means so offensive as to indicate putridity of long standing. On these grounds, though unwilling to assign a cause of death, he was decidedly of opinion that famine had not induced the fatal termination.

It is impossible to read this opinion, and compare it with the observations of able anatomists on persons known to have died from hunger, without agreeing with Foderè, that Petit appears rather as the advocate of the accused, than the partial investigator of truth.

On the trial, it was conclusively proved, that the parents had been guilty of mal-treatment; and though, after the opinion of Petit, their lives could not be affected, yet the father was sentenced to the gallies for life, and the mother to perpetual banishment.*

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* Foderè, vol. 6, p. 228 to 231.

CHAPTER XIV.

WOUNDS ON THE LIVING BODY.

1. Of wounds in general—duration of them—slight—dangerous, and mortal. Notice of each. Circumstances which may aggravate the danger of wounds—The age and constitution of the patient, and his maladies—his passions—negligence or delay—insalubrity of the atmosphere—ignorance or unskilfulness of the surgeon. 2. Nature and prognostics of wounds of particular parts—Wounds of the head—of the face—of the neck—of the thorax—of the abdomen—of the extremities. Laws as to the time within which death from wounds is deemed murder. 3. Of mutilation—French laws against it—English—American—English Coventry act. Cases under it.

It has been already stated, but it is proper to repeat in this place, that the term WOUND, in legal medicine, comprehends all lesions of the body, and in this it differs from the meaning of the word when used in surgery. The latter only refers to a solution of continuity, while the former comprises not only these, but also every other kind of accident, such as bruises, contusions, fractures, dislocations, &c. &c. In this sense, then, the term is to be understood in our future remarks.*

The questions which arise in all cases of wounds that come under judicial investigation, are the following: how far has the person who caused the injury contributed to the death of the deceased, or to the lesion of one or other of the functions of the body? And again, to what class is a certain wound to be referred? These are enquiries of great magnitude—and correct views, as well as stable principles, are needed in order to answer them properly. Medical and surgical works are filled with instances of remarkable recoveries from the most dreadful wounds, and also with cases of death from apparently the slightest ones. If we take these as our guide, the consequence will be, that nothing of a determinate nature can be agreed upon, and every physician, whenever he enters a court of justice, may, by the aid of a corresponding example, prove that a dangerous wound is not so, and that its fatality has been owing to ignorance or neglect. Such power is too extensive and too important to be granted to every medical witness, and whatever we take from his hands, and refer to sound principles and general rules, is a solid gain to the cause of truth and justice.

In further proceeding with my observations, I shall, in the first place, notice the subject of wounds in general, and afterwards examine the nature and prognostics of wounds of particular parts. The subject of mutilation, from its entering so much into our statute law, will form a third section.

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* Ballard, however, objects to this, and recommends the word LESION for the general term, page 313.

1. *Of wounds in general.*

Wounds, from their nature, may be either *slight*, *dangerous*, or *mortal*. By a slight wound, is meant one in which there are no parts injured that are important to carrying on life, or any of its functions, and whose uniform course is to heal quickly, and to leave no lesion or deformity. A dangerous one, implies a wound which, without being mortal, is still not exempt from danger, and presents more or less difficulty in its cure. Lastly, mortal wounds comprehend those whose consequence and effect is death. In this sense only is a wound in legal medicine termed mortal. More minute divisions than these which I have named, may, however, be made. and indeed are indispensable. Thus, a wound may be in itself mortal, or it may be mortal by accident. It may be in itself dangerous, or it may become so from some complication, or from not having been properly treated. Even slight wounds may become dangerous from neglect, from a debilitated or diseased state of the stystem, or from mal-treatment, such as endeavouring to excite suppuration, when the aim ought to be to promote adhesion. In such cases, the blame should be laid where it properly belongs.

Circumstances as well as accident have a considerable effect on wounds. Bohn suggests several instances of this nature, in which their mortality is prevented by particular phenomena. Thus, a small portion of the omentum, or the fat of the intestine, may so place itself in the mouth of a wounded blood-vessel in the abdomen, as to prevent a hæmorrhage, while, if not thus obstructed, it would be mortal.* Again, it has been repeatedly observed by surgeons, that there may be such an adhesion of the pleura to the lungs, as that the blood or pus from the latter will flow outwardly, when they have been injured by a penetrating wound. The same author remarks, that it has never been demonstrated, and indeed in the nature of things it never can be proved, that a wound from which there is a recovery, is precisely similar to one which has proved fatal, although externally they may be similar in every respect. In the one case, there can be no dissection to prove its nature, and, in the other, there may have been many peculiar circumstances not attendant on the former.† This observation is in itself a sufficient answer to the argument already referred to, of proving the possibility of recovery from dangerous wounds, by a reference to similar instances.

The subject may be farther illustrated by examples. A man, says

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* Bohn, p. 31. He mentions a dissection, in which the right illiac artery was found wounded, and life had been prolonged for thirteen days, evidently from this cause.

† Bohn, p. 27. "Dubium an vulnus sanatum exacte idem cum non sanato fuerit."

Bohn, receives a wound in the bottom of his stomach, a severe hiccup, faintings, and retchings come on, while the half-digested food that he has taken, passes out through the aperture. This individual is, however, cured in a month's time; whilst another, whose wound is accompanied with similar symptoms, except that he does not hiccup, and which in itself is a favourable symptom, dies in three days. Shall we say that the latter was not mortally wounded, because the former escaped? Dissection will teach us the incorrectness of this deduction, and that in the instance of mortality, the wound has been rather lateral than deep, and has touched the left gastric artery, in consequence of which, there has been a profuse hæmorrhage into the abdominal cavity. Again, an individual receives a violent blow on the head, which causes a depression of the cranium, and is accompanied with a considerable hæmorrhage from the head and ear, and a loss of sense and motion. After a day or two, the depressed piece of bone is raised, he recovers his senses, the hæmorrhage ceases, and, at the end of some weeks, the patient recovers. Another is injured in precisely the same manner, is treated similarly, and notwithstanding, dies at the end of the seventh day, without ever recovering from the state of coma; and, on dissection, extravasated blood is found in the ventricles of the brain.*

These instances are sufficient to prove how little dependance is to be placed on analogy, and they also illustrate the importance of fixed rules concerning the mortality of wounds, founded exclusively on anatomical and physiological data.

A strict definition of life is not necessary at this time, and it is sufficient to state, that it depends on the union and reciprocal influence of the functions which compose it, and particularly of the circulating, nervous, and respiratory systems. Lesions of the chylopoetic system come next in order, as the body cannot survive without nourishment, and the danger to life will of course be in proportion to the extent of the injury, and the immediate necessity of the organ. Wounds which rupture the large blood-vessels in one or other of the large cavities, such as the head, the thorax, or the abdomen; those which penetrate the auricles or ventricles of the heart, the trunk of the aorta, or vena cava, are irrecoverably *mortal.* There are, however, so many cases on record, in which individuals are stated to have survived for some time, with large abscesses in the brain, or even a ball in that part, that we are justified in viewing wounds of the heart more fatal than those of the head. Next to these are wounds which, from their depth, penetrate into the spinal marrow—wounds of the head, complicated with such severe injury, that venesection and the trephine do not alleviate them—a division or twisting of the spinal marrow in the cervical vertebræ—a division of the eight pair of nerves—and a general affection of the nervous system, from blows or injuries on parts which are the centre of its various departments, such as the pit of the stomach. In the next place, may be mentioned as mortal wounds, such as prevent the function of respiration—a total division, or a large wound of the trachea; and particularly, if, in the latter case, the underlip of the wound is retracted inwards—wounds penetrating through the bronchiæ, and wounds of the diaphragm, particularly of its tendinous portion. To this class belong, also, extensive wounds of the pharynx, œsophagus, and stomach—of the duodenum, thoracic duct, and mesentery, and particularly, if a large number of the lacteals be divided, together with severe wounds of the liver, spleen, pancreas, gall-bladder, and the ductus cysticus and choledicus. Wounds of the urinary passages, kidneys, ureters, bladder, impregnated uterus, and amputation of the male genital organs, are all ordinarily mortal, unless immediate aid be afforded, as are also extensive and penetrating ones from fire-arms, accompanied with fracture of bones.

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* Bohn, p. 28-29.

All these accidents, from the importance of the organs that are injured—the extravasations that occur, or the hemorrhage which accompanies them, and which it is often impossible to check, are usually mortal. Such, however, are the powers of nature, and so extensive are its resources, that hope should seldom be abandoned. If called upon to make an immediate report, it is proper to form a prognostic on these principles, and to mention the danger that is present. On the trial, however, the conviction must be decidedly stated, that the wound was a mortal one, and that no surgical aid could have saved the patient, or, when applied, had no beneficial effect.

Among *dangerous wounds*, or those concerning which we cannot give a decided prognostic, must be ranked such as are inflicted on organs essential to the exercise of the vital, natural, or animal functions; and as to their consequences, they may be divided into those which may become mortal, and those which may interrupt the exercise of any function. To the first class belong all penetrating wounds, though unaccompanied with symptoms that indicate immediate danger—all contused wounds, whether on the head, thorax, or abdomen—all wounds of the extremities, and particularly where surgical aid cannot be procured in time to suppress hemorrhage, and all compound fractures and luxations, particularly if the part be much surrounded by nerves and muscles, and if it be near a joint. Even simple contusions or blows may become dangerous, from a rapid disorganization of parts, and a consequent mortification; and especially, if, on tendinous or ligamentous parts, the supervention of tetanic affections are to be dreaded.

In the second class are included all wounds made in any of the secretory organs and their ducts—in the organs of sense, as the eye, ear, nose, and mouth—in the generative organs, as the testicles, penis, and unimpregnated uterus. Also, fractures of the clavicle or sternum, and depression of the xiphoid or ensiform cartilage—transverse wounds of the great pectoral or dorsal muscles—and wounds of the muscles of the abdomen, particularly near the linea alba, and pubis—wounds of the perineum combined with injury to the canal of the urethra, pricking of the tendons of muscles, together with wounds of important branches of nerves.

Slight wounds comprehend those injuries in which the skin and the muscles are divided, the latter in the direction of their fibres, and where no tendon, aponeurosis, large nerves, or blood-vessels are touched, and the system has not received a severe shock. To this class also belong simple luxations and fractures.

But, as we have already observed, these are circumstances which render this division an arbitrary one, and which cause a mortal wound of the lowest class to be inevitably mortal—a dangerous one to become mortal—and a slight one, dangerous. These circumstances may be reduced into four classes, each of which deserve particular notice.

1. The constitution and age of the patient, and his antecedent or coexistent maladies may exercise a baleful influence on the injury received. Thus, for example, there may be a complete transposition of parts—the heart is sometimes found on the right side of the thorax—the spleen has been discovered to occupy the place of the liver—the stomach has descended as low or even lower than the umbilical region, while the bladder has risen into the abdomen. It would certainly be unjust, except in cases of premeditated murder, to consider the criminal as responsible for the fatality of wounds given under such circumstances. Again, an individual may be suffering under hernia, and in that situation may receive a mortal wound from a cutting instrument, or may die from a contusion or blow on the part, which, under other circumstances, would not prove dangerous.[*] The condition of the wounded person may also be rendered hazardous, from a variation in the ordinary distribution of blood-vessels—from the presence of aneurism—from an extreme thinness of the bones of the cranium,[†] or a venereal caries of the same part—from having large umbilical vessels, or finally, from being afflicted with some chronic disease, or suffering under debility. Slight wounds may also be rendered dangerous, and even mortal, from an extreme irritability of the nervous system, from previous habits of drunkenness, or from a scorbutic, cancerous, cachectic or venereal habit.[‡] A case is thus cited by Bohn, of an individual who, in a quarrel, received some blows on the chest, and after

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[*] Bohn, p. 70-71.

[†] A remarkable case of this description is stated in a late journal. A respectable individual put an end to his existence by hanging himself. Dr. Wesener was directed by the proper officers to examine the body. The examination of the thorax and abdomen presented nothing beyond what is usually observed in such cases, but on opening the head, he found the following deviation from nature. About the middle of the sagittal suture, the bones of the cranium were, for the space of a sixpence, as thin as the most delicate lamella of bone, and in this spot were two openings, each about the size of a pin's head, through which two vessels ran, which arose from the superficial veins of the dura mater, and anastomosed with the veins of the scalp. On cutting into the scalp, though with great care, the blood flowed over the galea aponeurotica in such quantities as quite to redden it, and it appeared on examination, that the emissaria Santorini were cut through. It is evident, from this statement, that a blow on the spot in question would probably have caused death, either by direct depression, or by causing internal hemorrhage.—Quarterly Journal of Foreign Medicine and Surgery, vol. 2, p. 105, from Hufeland's Journal.

[‡] There are some individuals in whom an alarming hemorrhage is produced by the slightest abrasion of the skin. Metzger quotes a case of death produced in this

a short time, was seized with hæmoptysis, severe pain in the side, delirium and convulsions, and finally died. On inspection, a slight discoloration was observed on the back and limbs, while the genital organs were in a state approaching gangrene. The abdominal viscera were healthy, but the lungs and pleura adhered, and the former were filled with thickened pus.* In this instance, there was certainly sufficient of disease present to have produced death within a very short period, without the intervention of the blows. All the possible circumstances enumerated above should be kept in view, and particularly when wounds have been involuntary, or belong to what is termed, in law, manslaughter.†

But it may happen, that while the patient is suffering under a wound, he is attacked with disease and dies, and the question then arises, whether this fatality is owing to the wound, or the disease. In some instances, the solution is easy, but in others, it is attended with considerable difficulty. Thus, for example, a fever attended with comatose symptoms may supervene on a wound of the head, and pleurisy may follow a wound of the thorax. The probability evidently in such instances, is, that the injury has produced the disease; but there is, notwithstanding, sufficient latitude left for doubt, and circumstances may arise which will prevent us from assigning the wound as the cause of death. On the other hand, should gangrene, buboes, petechiæ, or the other symptoms of malignant fevers appear on a wounded person, in a hospital, or during the warm season of the year, or during the prevalence of such an epidemic, it would certainly seem that the cause of death is distinct from the danger of the wound. A similar

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way, by a scratch of the thumb-nail. Several relatives had previously died in a similar manner, (p. 327.)—See also the New-England Journal, vol. 2, p. 221, for some remarkable cases where this disposition occurred in families. In the Medico-Chirurgical Transactions, vol. 8, p. 224, a case of fatal hemorrhage from the extraction of a tooth, is related by Mr. Blagden. The coats of the arteries were found, on dissection, very thin, and nearly transparent.

* Bohn, p. 76.

† The most difficult cases probably that occur in the medical jurisprudence of wounds are those where persons in habits of intemperance engage in brawls, receive injuries and, after an uncertain period, die. The question frequently arises, whether the drunkenness or the blow has caused the loss of life. As a general rule, I would always lean towards the accused. The habitual use of spirituous liquors is so apt to produce a diseased state of the system generally, that unless positive malice be proved, we shall best promote the ends of justice by considering the offence as a secondary one. A case is related by Dr. Klapp, where an individual in Philadelphia, under such circumstances, died thirty-eight hours after the affray. He walked and spoke after it, and even drank part of a pint of spirits, but was shortly seized with insensibility, dilated pupils, oppressed breathing, and died without any return of sense. The bone and the brain beneath the injured part were examined, and found natural. *The mucous membrane of the cardia and the upper part of the stomach, was greatly inflamed*—the other parts were not diseased. Before the court, Drs. Hartshorn and Klapp gave it as their opinion, that the injury to the head had not been the cause of death, and that there was no appearance of a blow, on or near the region of the stomach. I fully agree with the verdict of acquittal in this case, but I would suggest whether, in some cases of severe injury to the head, a similar appearance of the stomach may not be produced. I refer, for an elucidation of my idea, to Dr. John C.

observation will apply when an inflammatory or typhus fever supervenes on slight wounds, and renders them fatal.*

The following instance, in which Zacchias was consulted, will illustrate the difficulty that may occur. During a period when the plague raged at Rome, one Ansovini received, in a quarrel, a wound on the head, which denuded the bone, but left no fracture. He withdrew by the assistance of two friends, one of whom continued to visit him, but died in four days thereafter of the plague. The wound appeared favourable for the first three days, but, at the termination of that period, a fever came on, accompanied with head-ache, bilious vomiting, and violent inflammation of the wounded part. On the fourth, the wound was gangrenous, and petechiæ and buboes occurred; and, on the sixth day, death followed. The person was arrested by the minister of justice, on the ground that it was the cause of death, or at least that it predisposed the individual to the attack of the plague. Zacchias was consulted by the friends of the accused, and he decided that the wound had not been the cause of death, because there were no symptoms immediately after its infliction that indicated a mortal injury to the head—that the appearances which supervened, were too rapid in their progress to appertain to it, and evidently belonged to the plague, and it was also evident he had taken this disease from the friend who visited him. Finally, two diseases were present in the individual, and the ordinary course of one is fatal, while that of the other is to proceed to a favourable termination. It is certainly proper to assign the former as the cause of death.†

2. The passions of the patient, and his negligence or delay, or that of his attendants, may render slight wounds dangerous, and dangerous ones mortal. This may happen, 1. By his obstinate refusal to undergo the proper treatment, either from fear or some other cause. 2. From errors in regimen, such as intemperance, from exposure in a very cold or a very warm place, or from giving himself up to the free indulgence of his passions. 3. By disobeying the directions of his physicians, as for example, if a man who has been wounded in the throat, should laugh, talk, or sing. 4. By yielding to anger or fear, so far as to tear off the bandages and dressings of the wound. All these circumstances will aggravate an injury, and render it dangerous or mortal.‡ There are others, which may be deemed accidental causes, such as a want of proper aid, of whatever kind it may be, and from whatever source it may arise. Both of these of course increase the guilt of the criminal,

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Warren's cases of apoplexy, with dissections, in the New-England Journal, vol. 1, p. 34. This anatomist has shown, that not unfrequently, a high degree of redness in the mucous coat of the stomach accompanies cerebral affections. Dr. Klapp's case is related in the American Medical Recorder, vol. 1, p. 156.

* Bohn, p. 88. This author divides the symptoms into three classes. "Alia ex vulnere ipso, ut tali, hanc à parte læsa immediatè emergant; alia aliam extra vulnus causam agnoscant; alia indifferenter se habeant, id est, modo à vulnere, modò aliunde eveniant: probe omnes ac singulæ ponderandæ sunt in vulnerato circumstantiæ, et ex harum demum collatione, cujus generis sit ille, individui presentis, prudenter inferendum."

† Zacchias. Consilium, No. 74.

‡ Mahon, vol. 2. p. 28.

if it can be proved that he inflicted the wound with a knowledge of them. To this class also belong every obstacle opposed to the surgeon's performance of his duty, and all attempts to disturb the patient, such as the prevention of sleep, and producing agitation of mind.

3. Insalubrity of the atmosphere, whether it be of a local nature, or the general constitution, may render slight wounds dangerous, and dangerous ones mortal. This circumstance has been noticed some centuries since, and the experience of every military campaign confirms its correctness. Thus, according to Bohn, Sebezius states, that wounds of the head were more readily cured in Italy and Spain than in Germany; and Foderè mentions his having observed the same on the coast of the Meditterranean, when compared with Paris. Ambrose Paré, a great name in surgery, observes, that at the siege of Rouen, many of the besiegers died of small and simple wounds, in consequence of the unhealthy atmosphere, but which was attributed by the army to poisoned weapons—an idea, which similar effects induced the inhabitants of that city also to harbour.[*]

Severe cold, excessive heat, storms of rain, snow, or hail, have all been observed to increase the danger of wounds, and for proofs of this, I need only refer to works on military surgery.

The air of large hospitals has also been found injurious, and it is constantly observed, that a larger proportion die of wounds at the Hotel Dieu at Paris, than in the Hospital de la Charité.[†] The very name of Hospital Gangrene, is sufficient to apprise us of the extent of the fatality that is sometimes experienced. In such cases, it is the duty of the medical examiner to apply the maxim of Hippocrates, that every thing which happens to the injured person, contrary to correct probability, does not belong to the essence of the disease. Thus, if there is a general or local morbid state of the air, and the most cautious examination proves that the wound had not effected any essential organ, it is his duty to state these facts, and to mention that death has originated from several causes, of which the wound is the slightest, although it may have excited the developement of the others.

4. The ignorance or negligence of the surgeon may aggravate or endanger the condition of a wounded patient.[‡] This happens when futile or injurious medicines or applications have been used—when the instruments employed are in bad order—when the surgeon is either ignorant or rash—or when seeing the danger, he does not obtain the aid of skilful persons. In general, when a dissection proves that no wound mortal in its nature has been received, and when none of the circumstances already enumerated can be urged as causing its fatality, the death of the patient should be attributed to the surgical attendant, rather than to the author of the wound, provided that it be proved that he neglected the sick person, or maltreated him, by leaving foreign bodies

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[*] Bohn, p. 78. Foderè, vol. 3, p. 276.

[†] Mahon, vol. 2, p. 95. "Dans certain hôpitaux, et notamment a l'Hotel Dieu de Paris, le trepan est presque toujours mortel."—Metzger, p. 376.

[‡] Bohn, p. 93, 96.

in the wound, which might have been taken away—by not suppressing hemorrhage—by not evacuating collections of pus when necessary—by employing tents improperly—by neglecting or hurrying operations—or by not causing the proper regimen to be observed.*

Notwithstanding the distinctions that have now been made, there are some doubtful and complicated cases, concerning which, great difference of opinion may arise, and the skill of the surgeon often forms the disputed point. To this class most commonly belong wounds of the head, such as those, for example, in which there are no symptoms indicating the necessity of trepanning, and yet extravasation is found after death. The diversity of advice given by eminent surgeons on this point, during the last twenty or thirty years, may also lead to unpleasant discussions. But it is the duty of the surgeon to acquaint himself with the most approved modes of modern practice—to apply them to the symptoms presented to his view, and then, if on examination the injury is found to be such that no efforts of art could have prevented its fatality, the death of the patient is to be attributed to the nature of his wound.†

2. *Of the nature and prognostics of wounds of particular parts.*

I shall endeavour to make this section as concise as possible, as it is only intended to be a general guide to the medical examiner. The opinions deducible from it, are subject to many qualifications, which the peculiarities of every case can alone indicate, and they are evidently not to be quoted as universally applicable.

We shall notice *wounds of the head* in the first place; and here a preliminary remark cannot too soon be made, or enforced, viz. that in no other part is the prognostic more uncertain, nor is there one in which the physician has more occasion for suspending his judgment. The general prognostic of wounds of the head depends on the nature of the injured parts—the age and condition of the patient—the nature of the instrument with which the wound has been inflicted—the force or violence used—the manner in which it was applied, and the effects that followed.

A wound of the integuments of the cranium, if inflicted with a cutting instrument, such as a knife or razor, may be deemed a simple wound, which will heal within the space of a few days.§ But if the instrument, although a cutting one, is of great weight, and has been projected by a strong arm, we should reserve our prognostic, on account of the subsequent affection of the brain, which may justly be dreaded. If a sharp-pointed instrument has been used, and it has penetrated as far as the bone, the inflammation and pain that follow are more severe than from incised wounds. When a contused wound has been inflicted, as by a stick or stone, the prognostic will depend much on the immediate symptoms, and it will be dangerous in proportion to the dizziness, nausea, insensibility, &c. that are experienced for a short time thereafter. A superficial contusion, accompanied with laceration and none of the above symptoms, may generally be deemed a slight wound. But a contusion, however slight, on the region of the temporal muscles, is scarcely ever exempt from danger, on account of the intimate connection of this part with the brain, by means of its nerves, blood-vessels, and membranes.

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* The laws at a very early period attended to this circumstance. In the Roman code, the *Lex Aquilia* declared, "Si verberatus fuerit servus, non mortifere, negligentiâ autem perierit de vulnerato actio erit, non de occiso." So also in the ancient French jurisprudence. If negligence or bad treatment was proved, it freed the individual, unless premeditated design was established.—Foderè, vol. 3, p. 290-291. The same principle practically exists in our own judicial determinations.

† The principal authority used in this section, is Bohn—*De Renunc. Vulner. in genere.* Foderè, (vol. 2, p. 251 to 294,) and Mahon's (vol. 2, p. 1 to 62) observations, are generally derived from this source.

§ Wounds of the integuments of the skull are extremely capricious in their results; the slightest, especially punctured wounds, often communicating inflammation to the bone and membranes of the brain, while wounds greatly more extensive heal easily.

Wounds of the pericranium in good constitutions and well treated, are not dangerous; but, in bad ones, they are often serious, and are succeeded by an erysipelatous inflammation, which is readily extended to the brain. A complete division of the pericranium is much less to be dreaded, than a wound from a sharp-pointed instrument. In venereal patients, caries of the bone is a frequent consequence of such injuries.*

Fracture of the bones of the cranium may take place without any correspondent injury of the integuments, and the symptoms in such cases are extremely equivocal and deceitful. Our deduction must however be drawn from the circumstances that immediately followed the infliction of the wound—from those that afterwards supervene, and from a consideration of the causes producing them. Among the first are vertigo, loss of sense and motion, vomitting, and bleeding from the nose and ears. Among the latter, may be coma, convulsions, and paralysis. Fracture may however occur without any of these being present; and again, they may all be present, without any fracture, and result from concussion of the brain. It should be remembered, that fracture, accompanied with depression of the bone, is usually more dangerous than when none is present.

Concussion of the brain is always dangerous, as are also all wounds of the brain and its membranes. On these it is not necessary to enlarge at this time. It is however proper to remark, that the prognostic of wounds of the head, is, for the most part, that they are dangerous, and require the strictest attention. And this is rendered more necessary,

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Of the latter, a striking example came under my own immediate observation. A soldier got drunk on the line of march, and was put into a baggage-waggon, out of which he fell, his head coming right in the track of the wheel, which passed obliquely over it, stripping the whole of the integuments off one side of it, and leaving the bone completely bare. The integuments were replaced and secured by stitches, and the whole kept *in situ* by means of bandages. He travelled for four days on the waggon, when he was put into the hospital, and in less than a fortnight was enabled to resume his duty.—EDITOR.

* Was there ever a case known, in which the bones of a venereal patient run into caries where no mercury had been exhibited?—EDITOR.

since it has often happened that injurious and even fatal consequences have been produced long after the infliction of the injury, and that too, where the immediate symptoms have given little or no reason for such a termination.* The opinion of the medical examiner must therefore be founded not only on general principles, but on the symptoms that are present; and, when called into a court of justice, he should explain how uncertain the recovery from such injuries always is, and on the other hand, that persons have survived the most terrible accidents. The presence or absence of fever, or delirium or coma, and the healthy or livid appearance of the wound, all aid in determining on the danger. The following aphorisms of the illustrious Vicq d'Azyr, are quoted by French surgeons as comprising the experience of the art on these points, and they are evidently deserving of remembrance. 1. That the largest wounds of the head are not always the most dangerous. 2. That it is possible to lose a considerable quantity of the brain, without death ensuing. 3. That the slightest injuries are often succeeded by fatal consequences, and that hence they should in no case be neglected. 4. That a contusion of the bone alone may gradually extend itself, so as to affect the brain.†

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* The succeeding case will illustrate the difficulties that sometimes envelope the cause of death. "A woman received a blow on the head from a laundress's iron, but no fracture or injury of the cranium was discoverable, though it was thereby laid bare. She was (by the advice of the celebrated Cheselden) trepanned, and still no mark of injury about the cranium was discovered. She went abroad, and followed her ordinary business for a fortnight afterwards; but, at the end of twenty days from receiving the injury, died. On opening the head, they found a very large imposthume in the middle of the brain. This occasioned some perplexity about the real cause of death. The surgeon who had managed the case, was rather inclined to attribute the death to the blow, but would by no means deny that it might have proceeded from some inward cause. The deceased had been subject to frequent and severe headachs, before the accident occurred. Mr. Cheselden being examined on the trial, declared that he could not conceive how a blow should be the cause of death, where there was no extravasation, and the person could go about for a fortnight afterwards. His allowing, however, that *similar appearances were sometimes found in the brain of persons subject to headachs,* was of more importance to the prisoner."—Smith, p. 246.

The following is one among a thousand instances where death has been induced at *distant periods* from the infliction of violence on the head. The patient died several weeks after receiving the injury, and, on dissection, Mr. Charles Bell discovered a fracture at the base of the skull; and the foramen magnum having been thereby roughened, a sudden turn of the head had forced a spiculum of bone into the spinal marrow. (Smith, p. 252.) The principal and important inference to be drawn from such cases is, "the *impropriety* of maintaining the general proposition, that the death of persons recovering from the *immediate* symptoms of violence, should never be ascribed to that violence." Mr. Howship relates a case, where a slight blow on the head, at the age of fifteen, produced death *forty years* afterwards. Pain was frequently present during life, and latterly somnolency and impaired vision. On dissection, the bone at the place injured was seen transparent, and almost wholly absorbed, and the portion of brain under it was indurated and schirrous.—New-England Journal, vol. 9, p. 403.

† Foderé, vol. 3, p. 312. I must be permitted in this place to caution the young surgeon not to use the trepan, without a due regard to the rules laid down in surgical works. He may otherwise be injured in his reputation before a court of justice, and his practice may be condemned by those who are better informed.

Wounds of the face are more or less dangerous, according to the part injured, but in considering these, it is also necessary to take into account the deformity and irregular cicatrices that follow them. The latter circumstances have been noticed in the jurisprudence of England and our own country, as we shall state in the succeeding section.

Superficial wounds of the face are easily healed, but when deep, and attended with much loss of substance or denuding of the bones, they are tedious, and leave considerable deformity. Wounds of the forehead, in which the frontal muscles are divided transversely, or of the eyebrows, cause the upper eyelid to fall down, and may produce a lasting debility of the parts. Wounds of the eyes, when of considerable extent, must always be deemed dangerous, from the nature of that organ, and from the intimate connection between it and the brain. A wound with a sharp-pointed instrument has been known to pass through the orbit, and prove fatal.* Wounds of the transparent cornea always

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“ There can be only one genuine reason for trepanning, viz. to remove such pressure from the surface of the brain as gives rise to *existing* bad symptoms.”—Cooper.

* Macklin, the comedian, was tried for murdering another actor, by lungeing at his eye with a piece of pine-stick, which entered the brain through the orbit; he was acquitted, as no *malus animus* could be proved.

In the Edin. Observer of the 27th January, 1828, I find the following paragraph.

“ Ten days ago James Bradshaw, hatter, in Greenock, having been engaged in a scuffle with another hatter, received a wound in the head. He remained slightly complaining until the 21st instant, when he expired. On dissection, he was found to have been killed by an injury on the eye, which had forced in the bone immediately behind the eye; (the superior orbital plate I suppose) on the brain.”

Baron Hume, in his Work on Criminal Law, (p. 256) mentions the case of a man of the name of Richard Carse, who was tried for murder, which he perpetrated by beating another man about the head with a *quaigh* or wooden dish, a splinter of which detached itself and entered the brain through the eye, when it snapped off short, and caused his death in a few days—the splinter was taken out of the eye after death.

There are cases where injury of the eye has caused death—in opposition to them, I shall relate some where the eye has received injuries as severe, to all external appearance, as those, but which the patient has survived.

A case is related by Gooch, where a man had his eye blown out by the bursting of a gun; the surgeon dressed it, but on the second dressing, he perceived something hard among the injured substance of the eye; on examining it he found it was metalic, and getting hold of it with his forceps, he pulled it out, when, to his surprize, he found that it was the breech of the gun, which had been forced backwards by the recoil, and been jammed into the orbit.—Notwithstanding this extensive injury, which totally annihilated the eye, the man made a perfect recovery.

Mr. Liston, of Edinburgh, related to me the case of a man, who, while blasting the roots of trees, had a splinter driven into the eye, which from its length must have passed through the foramen opticum, and penetrated into the brain. Mr. L. removed it long after, and the man recovered.

Another more extraordinary case, which also involves not only injury of the eye, but that of the brain, was related to me by a gentleman who attended the patient.—In a duel in the West Indies, one gentleman hit another in the eye—the ball of which was completely obliterated, and the leaden bullet passing in through the orbit, came out in front of the external ear. Notwithstanding which, the officer recovered with the same facility as if he had only undergone the infliction of a flesh wound.

Sometimes balls find their way into the lower part of the orbit, or somewhere behind the ball of the eye, and deprive it of sight altogether.

I saw an instance of this in Canada. Lieut. Gray, my brother-officer, received a leave a scar, and intercept vision. Wounds of the iris cause a loss of sight, and if the instrument penetrates to the vitreous humour, the eye is left empty, thus combining blindness with deformity. Wounds of the nose, from a cutting instrument, leave great deformity, and particularly if the cartilaginous part be injured—if inflicted with a round instrument, or by a blow, it may not only be crushed, but the sense of smell may be destroyed. The ethmoid bone has been driven in this way upon the brain.* Lastly, a sharp-pointed instrument has sometimes penetrated the nose, touched the brain, and hence proved fatal.† Wounds of the external ear are unaccompanied with danger, but the deformity is a serious one. Wounds of the internal ear may either destroy hearing, or, from their vicinity to the brain, prove in themselves dangerous. Wounds of the lips, if there be great loss of substance, not only deform, but are injurious to the speech, and are sometimes accompanied with a constant flow of saliva, particularly when any of the glands have been opened. ‡ Wounds of the ranular artery sometimes occur in children, from dividing the frœnum, and where the hæmorrhage cannot be suppressed, they have been known to prove fatal. Wounds of the parotid gland are always tedious in curing, and they sometimes become fistulous.

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shot in the left cheek—the ball lodged behind the right eye, and totally deprived him of the use of it. What renders this case the more extraordinary is, that though the shot, which was a small one of that kind, known by the name of "buck-shot," and which the Americans introduced in warfare, must have either penetrated through the nose or through the brain; no bleeding at the nose followed the wound, and the only appearance by which it could externally be known that the ball had injured the eye was, that it was very much blood-shot and inflamed for some days; when these appearances went off, he was completely deprived of sight in the right eye, and something like a squint, or at least a want of power in moving that eye in concert with the other, remained ever after.—EDITOR.

* "A man was killed by a blow on the nose—the consequence of which, in the interim, was, that the lower jaw could not be opened, and in the opinion of the surgeon he died from inanition, sixteen days after the accident. He was also unable to perform the usual natural evacuations. There was no fracture about the head, and the external wound had nearly healed up."—Smith, p. 254.

† Blows on the nose, which have the effect of fracturing the bone, produce frequently not only personal deformity, but ultimately loss of the power of smelling, and sometimes an insufferable stench, proceeding from the diseased state of the bones inside the nose, called by the French surgeons *punais*, which has the effect of rendering its unfortunate victim quite unbearable in society. I had a case of this kind under my charge while in the army.—The patient was a lad of the name of Tobin, who, though I tried every means of recovering him, was ultimately obliged to be discharged from the regiment, because the stench he created was so intolerable, that it was found impossible for any one to sleep in the same barrack-room with him.—He had received an injury which had beat in the bones of his nose previous to entering the regiment, but so far as I am aware the disease broke out afterwards.

Wounds of the arteries of the cheek internally, sometimes prove dangerous, from the bye-standers not having skill or presence of mind enough to stop the bleeding by the very simple means of placing the finger inside of the mouth, and compressing the artery against the thumb externally. Instead of this, they generally resort to the application of styptics and charpie. A young lady, in the West of Scotland, nearly lost her life from this mode of treatment.—EDITOR.

‡ Wounds of the artery sometimes cut in dividing the frœnum of the tongue, are easily commanded by squeezing the divided end in a cleft twig covered with lint.—EDITOR.

In all cases of wounds of the face, the physician should state in his report the degree of deformity that has been produced.

Wounds of the neck also vary greatly as to their danger. Wounds of the integuments and muscles of the neck, may be considered simple wounds; but it must be added, that they generally heal with difficulty, in consequence of the mobility and looseness of the parts. Transverse cuts may indeed prove dangerous, and affect the motions of the head, or of the pharynx or larynx, and thus prove an impediment to the due exercise either of speech or deglutition. * Wounds of the carotids and internal jugulars, are generally fatal, since it is often impossible to procure the necessary assistance in time to check the mortal hæmorrhage, and for this reason lacerated wounds of these parts are not so soon fatal as clean cuts. Wounds of the pharynx and œsophagus are peculiarly dangerous, as other important parts are generally divided along with them; but even if injured alone, as from stabs or gun-shot wounds, they are much to be dreaded, since the nourishment of the system must be carried on through them, and the action of deglutition is directly opposed to a speedy adhesion of parts. Even wounds of a portion of the fibres surrounding the œsophagus are dangerous, inasmuch as they induce a weakness of the action of deglutition, and also, by the inflammation that sometimes supervenes, tend to induce compression on the trachea. Wounds of the larynx are serious injuries, as they derange or weaken the voice. A wound of the recurrent nerve alone, on one side, seriously affects this organ, but if both be divided, a complete muteness will follow. Injuries of this description, however, if not of a complicated nature, cannot be considered mortal. Penetrating wounds of the trachea are always dangerous, since from its never being in a perfectly quiet state, it is difficult to produce a speedy reunion.† Numerous cases, however, prove that a partial transverse division is not mortal, but it is allowed that a complete division is generally so ‡—more, however, from the vessels that must be divided to accomplish this, than from the injury itself. § Wounds of the par vagum, either on one or both sides, are absolutely fatal. Fractures of the cervical vertebræ are

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* There is one instance, and only one, of a divided carotid not proving fatal. In this instance, Mr. Carpue, of London, being called at the moment, secured the vessel.—Editor.

† A fatal case of rupture of the trachea by external violence, (a kick,) is mentioned in the Edinburgh Medical and Surgical Journal, vol. 18, p. 412.

‡ A case occurred in the neighbourhood of Glasgow, where the trachea was totally divided by violence; a boy, driving the gin of a coal-pit, placed himself on the end of the lever. On stretching out his head to look at something, his throat came in contact with a post; such was the force with which he was going round, that the trachea was ruptured across. He survived for several days, but in great agony.—Editor.

§ There are, however, cases mentioned by surgical writers, in which the trachea was completely cut asunder, and even the œsophagus opened, without any wound of the carotid artery.—See Dorsey's Surgery, vol. 1, p. 69. A case is also given in the Edinburgh Med. and Surg. Journal, (vol. 16, p. 353,) in which the trachea and œsophagus were divided across, and which did not terminate fatally, although the parts did not reunite. This is a very interesting narrative.

The following case was communicated to me by my friend Mr. Marshal, author highly dangerous, and if the spinal marrow be injured, they are fatal. * Luxation of the neck is generally fatal, from pressure on the same part. Wounds piercing the vertebræ, or passing between them, are suddenly mortal. Injuries of the neck, from contusion, are always dangerous; and should they end in death, must be judged of, by the appearances that are found on dissection, as extravasated blood, laceration, &c.

Wounds of the thorax are divided into external wounds—into penetrating wounds, unaccompanied with injury to any of the organs in that cavity, and into penetrating wounds, with lesions of those organs.

External wounds from a cutting instrument belong to the class of simple wounds, but from contusions or falls, may become dangerous, either through the extension of inflammation to the internal parts, or from the rupture of some blood-vessels. Fracture of the ribs, if not complicated with their sharp points pricking inwardly, are not absolutely dangerous, although there is even then some impediment to respiration, and some apprehension of inflammation. But should the rib be much splintered, and the points not be reducible, it may end fatally. Penetrating wounds are not in general dangerous, unless combined with fracture of the ribs, or the rupture of some blood-vessels. Internal hæmorrhage or emphysema is often a dangerous, and even fatal symptom. Wounds of the lungs are dangerous, and the prognostic is always doubtful when the injury has been inflicted at the upper part of the thorax, or at the posterior side near the junction of the ribs with the vertebræ. The symptoms here require the strictest attention, as no case should be despaired of. † These organs are also subject to concus-

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of a work on the Medical Topography of Ceylon, under whose charge the patient was.

When the Indian army were sent to Ceylon, during the mutiny in that country in the years 1818 and 1819, a native cooly, or labourer, who followed the camp, was shot through the throat, the ball dividing the wind-pipe and œsophagus both together. He lived for some days after, in a state of the most dreadful and excruciating suffering, the contents of the stomach or the food he attempted to swallow choaking up the wind-pipe, and producing violent fits of coughing, which threatened him with instant death from suffocation. His breathing was so loud, that it could be heard outside of the tent where he lay.—EDITOR.

* A remarkable case was stated by Soemmering, in 1793, of a patient in whom there was a fracture and luxation of the vertebral column. He suffered extreme pain, and his extremities gradually became gangrenous—*but he survived five months.* —Metzger, p. 320.

† A very extraordinary case of this kind came under my care some years ago. Sergeant Verney, of the 89th regiment, at the battle of the Falls of Niagara, received a shot on the breast, about an inch and a half on the right side of the sternum, which came out behind, about the same distance from the spine—the lungs were completely penetrated, and the air passed through both apertures. On his being brought to me, I thought the wound must necessarily prove mortal, and having a great many wounded to attend to, I merely dressed it with lint, but secured by straps: next day, instead of finding him dead, as I expected, I found that he was easier, and that fever had commenced. I bled him freely, and paid particular attention to him, and in the course of a fortnight he was so well as to be fit to be removed to the general hospital at York. He afterwards recovered completely.

Mr. Maiden's case of the man who was transfixed through the thorax by a gig shaft, must be fresh in the memory of every medical man.—EDITOR.

sion, which is termed *wind concussion*, and is usually fatal. Fractures, luxations, and contusions of the vertebral column, are all highly dangerous, and may sooner or later prove fatal.

It is difficult to conceive of the pericardium being wounded without a correspondent injury of the heart. But, if separate, it is to be deemed a highly dangerous wound. Wounds of the heart, of its ventricles and auricles, are mortal; but it is remarkable, that numerous cases are on record, where life has been prolonged for a considerable time after the infliction of the injury. Bohn quotes several cases of the kind,* and an instance occurred in the British army in Spain some years since, where a soldier survived for thirteen days with a musket-ball in his heart.† The reason in some of these cases is, that the instrument which causes the wound prevents, by its closing the aperture, that fatal hæmorrhage which otherwise would soon follow.‡ Wounds of the aorta and vena cava are fatal. It is hardly possible that the thoracic duct can be wounded without affecting other vital parts, but if it should occur, we must deem it fatal, as the chyle, instead of passing in its ordinary course, is diffused into the cavity of the thorax. For similar reasons, the lower part of the œsophagus is scarcely, if ever, wounded separately, but if so, it is certainly mortal, as it prevents the proper passage of the food, and totally impedes the function of nutrition. Wounds of the vena azygos are mortal, as they are attended with a hæmorrhage which it is impossible to suppress. Wounds of the diaphragm, if made with a sharp-pointed instrument, such as a sword, are dangerous, if only the muscular parts be injured; but if the tendinous ones are also injured, they are considered fatal. *

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* Page 26, 221-222.

† Edinburgh Med. and Surg. Journal, vol. 14, p. 129.—See also Triller *de mirando cordis vulnere post* xiv *diem demum lethale*, in Schlegel, vol. 5, p. 249.

Instances of people living for any period, longer or shorter, after the heart has received a severe injury, are to be found in every work on forensic medicine; and these are not to be looked upon merely as physeological curiosities, they sometimes involve questions of life and death.

A case was tried in Glasgow, in the year 1819, of which the following is an outline.

The keeper of a house of bad fame, in Greenock, was indicted for the murder of a sailor, by shooting him through the chest. It appeared, from the evidence of the medical witnesses, that the auricles and part of the aorta next the heart were shattered to atoms by the slugs and brass-nails with which the piece was charged, and in their opinion, he must have dropped down dead the moment he received the shot; therefore, as the body was found in the street, and the door of the house was eighteen feet up an entry, it followed that the prisoner must have run after him into the street, and there shot him. For the prisoner, it was urged and proved, that he had shot him through the door of his own house, which he was attempting to enter by force; and besides direct testimony to this effect, from those within the house, and from a lad who was along with the deceased at the time, it came out on evidence, that there was a stream of blood from the door of the house to the spot where the body was found, which could not have run from the body towards the house, as the threshold of the door was on a higher level than the pavement of the street. On this evidence, the prisoner got a unanimous verdict of acquittal.—Editor.

‡ There are, however, some instances to which this explanation will not apply. I refer particularly to those cited by Dr. Dorsey; one from Dr. Babington, where a soldier lived some hours after a wound of the heart by a bayonet; and another from Pelletan, where the sufferer received a wound of the aorta from a small sword, and lived two months. "There is reason to believe," adds Dr. Dorsey, "that the heart has often been slightly wounded, without fatal consequences." (Surgery, vol. 1, p. 72-3-4.) See also Ballard, p. 331, 355. Belloc suggests that a clot may prevent the hæmorrhage, (p. 390.)

As a general deduction from these remarks, it may be observed, that the prognostic in wounds of the thorax is, in most cases, an unfavourable one, although they are not often mortal, unless some primary organs be injured. John Bell indeed directs his pupils never to call any wound mortal, unless it be plainly a wound of the heart. This advice may be proper in surgery, but it can have no bearing on legal medicine, since it practically excludes all prognostics whatever. I have therefore given the best-founded opinions that I could obtain, and will only add, that the prognostic in wounds of the lungs should in general be delayed, as the cases of recovery from desperate ones are so numerous, that we can never be justified in peremptorily declaring any particular instance a mortal wound. Wounds from fire-arms are, however, always more hazardous than those from cutting or sharp-pointed instruments.

Wounds of the abdomen, like those of the thorax, are divisible into external or penetrating wounds. The former are to be deemed simple, unless they have been accompanied with a violent shock of the system, or are of large extent. Penetrating wounds are to be dreaded, either from touching the peritoneum, and thereby causing inflammation, or from producing ventral hernia; and, in the latter case, the apprehension will be graduated on the nature of the viscus that has passed out, and the inflammation and strangulation that accompany it. †

Penetrating wounds may also strike one or more of the viscera contained in the abdomen, and in that case, the accidents that occur, and the medico-legal questions that arise, are among the most perplexing of this branch of our subject. Wounds of the stomach are to be deemed highly dangerous, although there has been great diversity of opinion concerning their mortality. Bohn and Teichmeyer pronounce all mortal, and the instances of escape as almost miraculous; while Alberti, Boerhaave, and Valentini, consider those only mortal, which have injured the lower part and the two orifices. A wound of the stomach was declared accidentally mortal by the medical faculty of Giessen, and absolutely mortal by the medical college at Frankort; while, in another case, a wound was considered mortal by the faculty at Leipsic, and not so by those of Helmstadt and Wirtemberg.[*]

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* I have taken this distinction from the systematic writers, although I am perfectly convinced of the correctness of a remark of Dr. Marc, that *it is useless to distinguish between wounds of its tendinous and muscular portions.* (Godman's West. Reporter, vol. 1, p. 44.) A very curious case of wounded diaphragm, which from its consequences proved fatal at the end of eleven months, is mentioned in the Edin. Med. and Surg. Journal, vol. 8, p. 42.

† The necessity of returning it as early as possible, is very manifest; and if this be not done, the criminal may escape punishment, at the expence of the surgeon's reputation.—See a case of this kind in Smith, p. 263.

This contrariety of opinion has arisen from a consideration of the following circumstances: wounds of the stomach have sometimes been cured without any bad consequences; various substances, such as knives, forks, pins, &c. have been swallowed without immediate injury; and the operation of gastrotomy has been occasionally performed with safety.[†] All these facts tend to show, that wounds of the stomach are not absolutely mortal, but they do not permit us to deny their danger. Certainly, if inflicted with a sharp-pointed instrument, and penetrating, they are to be deemed hazardous, and the chance of death is increased when the blood-vessels or nerves of the part have been injured. But a rupture or division of the coats of the stomach may also be affected by a severe contusion, or a blow on the part, without any external wound, surgically speaking, being present. Fabricius mentions the case of a man who was so dreadfully trod under foot, that not only the stomach was burst, but there was a rupture of the diaphragm, and the food passed into the cavity of the thorax, and notwithstanding this, except some slight elevations of the epidermis in the form of vesicles, the integuments and abdominal muscles did not appear in the least injured.[‡] It will not appear surprising that sudden death should be the consequence of a blow on the epigastric region, when it is recollected that it is the seat of the solar plexus, and of the semi-lunar ganglion, parts especially subservient to life; and also that, on dissection, no inflammation of the stomach and the other organs should in such a case be found.[§] Wounds of the intestines are less to be dreaded than those of the stomach, and the instances of recovery are infinitely more numerous. But although all surgical works abound with these, we must not deem them destitute of danger, and if death follows after proper treatment, it is to be attributed to the injury. Wounds of the smaller intestines are more dangerous than those of the larger, not only because they perform more important functions, but are supplied with a greater number of nerves.[*] Wounds of the mesentery cannot be deemed mortal, unless some of the large blood-vessels of the organ, or its principal glands, be injured; and in these cases, the danger arises from not being able to suppress the hæmorrhage, or to supply the loss of the chyle. [†]Wounds of the omentum are to be estimated like those of the mesentery; but it deserves remark, that a contusion is apt to induce inflammation and gangrene. Wounds of the pancreas seldom occur, unless some other viscus be injured at the same time. If they should happen separately, the cause must have been an instrument entering at the back, and its wound cannot be considered as mortal, unless some arterial or venous vessels have been injured. Wounds of the liver are generally mortal, and their fatality originates in some blood-vessel being injured, or in the consequences that ensue. Superficial injuries are, however, frequently healed. Wounds of the gall-bladder are deemed absolutely mortal, as its fluid is stimulating to a high degree, and occasions inflammation and most violent pain.[‡] Wounds of the various ducts are mortal. Those of the spleen are to be estimated like wounds of the liver; if deep and penetrating, death will follow from hæmorrhage. There are, however, many cases of recovery from injury to this organ [§] It is a common circumstance, in cases of sudden death from accidents, falls, &c. to find the spleen or liver lacerated, and this is therefore to be deemed a fatal injury.[‖] Wounds of the kidneys have often been suc-

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[*] Mahon, vol. 2, p. 122. Valentini's Pandects, vol. 2, p. 418 to 432. All the writers on legal medicine agree, that a wound inflicted on a full stomach is more dangerous than one on that organ when empty. It should therefore be a subject of enquiry, how long before the injury a meal had been taken.

[†] See a case of this nature in the Medico-Chirurgical Review, No. 1, p. 103. Also in Philosophical Transactions, vol. 19, p. 178.

[‡] Mabon, vol. 2, p. 126.

[§] "Inspectio et sectio aliquando nihil declarant," says Bohn, p. 114. So also sometimes with blows on the head; and a case of the latter description is cited by Smith, (p. 250,) from the History of the Royal Academy of Sciences of Paris. "A stout young criminal, condemned to be broken on the wheel, ran head foremost against the wall of his dungeon, with his hands behind him, and instantly fell dead. On opening the head, not the slightest appearance of injury was discoverable, either in the skull, brain, cerebellum, or spinal marrow, except a very minute separation in the squamous suture, which could not account for so sudden a death. The substance of the brain was unusually firm."

The effects of severe blows on the stomach, though well known to the vulgar, are hardly accounted for satisfactorily by the learned. A severe blow on the head, the seat of nervous sensation, often does not produce so violent an effect as a very slight blow over the semi-lunar ganglion. A case occurred in London, some years ago, where a man killed his comrade, by giving him a pat on the pit of the stomach with his open hand. By the practice of the Scotch courts, if one man kills another by a blow on the stomach, the fact of his having done so is construed into malice, or what amounts to the same thing, *recklessness*, as it is termed.—EDITOR.

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[*] It would appear that the small intestines possess some of the irritable sympathy so conspicuous in the stomach—death being brought on by some unaccountable cause where they are only slightly injured. Foderè mentions a case where instant death was caused by a slight prick in the small intestines, inflicted by the point of a butcher's knife. Though there was neither a sufficient effusion of blood to account for such a result by its effects on the vascular system, nor a sufficient length of time for inflammation and its consequences to arise.—Editor.

[†] If the omentum is protruded, and not speedily returned, it will, in common with all the other viscera of the abdomen, inflame and bring on gangrene, but the omentum is less obnoxious to inflammation than any other viscus. A strong illustration of this fact was related to me by a medical friend. A peon, or messenger, was brought to him in India, who had received a stab in the side three weeks before, through the wound of which the omentum had all that time protruded. On examination, he found that the viscus was adhering to the wound all round, and that inflammation had commenced without, and been communicated to the interior of the cavity. Gangrene supervened, of which he died in a few days after.—Editor.

[‡] There are but very few cases on record of wounds of the gall-bladder, distinct from other injury. One is mentioned in the Phil. Transactions, vol. 86, p. 341, of an officer, where the fundus was penetrated.. He lived a week. Sabatier mentions another case.—Cooper s Surgical Dictionary. See also Metzger, p. 366.

[§] A case is related by Mr. Ferguson, surgeon, where a part of the spleen was removed with safety.—Phil. Transactions, vol. 40, p. 425.

[‖] On the morning of the 1st of January, of the present year (1824), three soldiers attempted to get out of Edinburgh Castle, to join the riot with which the new year is cessfully treated; they are, however, dangerous, according to their depth, and the effusion of urine (if any) into the abdomen.* So also with wounds of the ureters. Wounds of the bladder would not seem to be even very dangerous, if we look at the success which ordinarily attends the operation of lithotomy. They may, however, prove hazardous from the effusion of its contents, or the injury of a blood-vessel.† Wounds of the neck and sphincters of the bladder are apt to leave incontinence of urine, and when this does occur, it should be stated in the report. Wounds of the uterus are dangerous in proportion to the hæmorrhage that follows, and the symptoms that supervene. If that organ be impregnated, the danger is of course increased.‡

In all these instances of wounds of the abdomen, the danger is aggravated from extravasation, and this again is increased according to the nature of the fluid, which may be either blood, chyle, bile, fæcal matter, or urine. An extravasation of blood is often within the power of the surgeon, but its consequences are however always to be dreaded. The other evacuations can scarcely, if ever, except in the case of the

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uniformly ushered in by the people of Scotland, mistook their way in the dark, and precipitated themselves over the perpendicular side of the rock. They were found dead next morning, and the livers of the whole of them were found on dissection to be lacerated.—Editor.

* A successful case of treating a severe wound in the kidney was related to me by my friend, Dr. Knox, of Edinburgh. A boy, at the Cape of Good Hope, received a deep wound in the left kidney, from a butcher's knife, which was thrown at him. He was brought to Dr. Knox, who caused him to be placed and retained in such a position, that the wound should be the most depending point of his body. In a short time, he made a complete recovery. There are instances of death arising from slight blows on the kidney, where it contains a calculus. A gentleman in India was tried for the murder of his servant, whom he killed by a blow on the loins; on it being proved that the kidney contained a calculus, the ragged points of which had punctured the blood-vessels, he was acquitted.—Editor.

† An extraordinary case of recovery from severe injury of the bladder will be found in the Edin. Med. and Surg. Journal, vol. 18, p. 318, related by Mr. Douglas, of Hawick.

‡ A medical friend of mine related to me the following case. When in Ceylon, he was called to see the wife of a sergeant, who had received a stab in the side with a knife, wounding the uterus, she then being in the 8th month of her pregnancy, and on asking her how she got so hurt, she said that in carrying out some knives which she had been cleaning, her foot slipped, and she let them fall, and fell on the top of them, when one of them entered her side, and produced the wound of which she soon afterwards died. She had, however, told some of her companions, the women of the regiment, that it was her husband who had inflicted the wound, and as it was known that they did not live on the happiest terms, this excited suspicion, and the husband was ordered for trial. On dissection, it appeared that the wound had entered from above, and gone downwards, which could not well have happened had she been wounded in the manner she described to the surgeon. From circumstantial proof, it was like to have gone very hard with the prisoner, but he was let off on the evidence of one of the surgeons, who, when interrogated on the subject, said, *that the wound was not necessarily mortal.* I have since learned the private history of the jury in this case, it is as follows:—The Ceylon jury consists of thirteen; of these, one declined voting, six were of opinion that it was manslaughter, and six wished to bring it in murder. In this state they sat for some hours; till at last, one of those that were for the severer sentence relented, and a verdict of manslaughter was given.—Editor.

urine, be remedied by means of operations, and are hence very generally mortal.*

Wounds of the testicles are dangerous, particularly if they have been contused or injured by a sharp-pointed instrument. Their division indeed by a cutting instrument may be mortal, unless the subsequent hæmorrhage be speedily prevented. The same remark applies to wounds of the penis; but, in other respects, injuries of this organ are not to be deemed dangerous.

The extent and variety of injuries that the abdomen and the viscera contained in it may receive, call for all the skill of the surgeon, and his judgment will be frequently exercised in deciding on the fatality or danger of wounds of this part of the system.

Wounds of the extremities are to be decided upon according to their nature, but the majority of them are not dangerous. Of simple wounds I have already spoken; and it is sufficient to add, that when the integuments and first layer of muscular fibres only are wounded, they will heal without difficulty. The presence of syphilis and scrophula may however cause their degenerating into ulcers; and it must also be noticed, that wounds of the extremities, in which the muscular fibres are transversely divided, will take a long time to heal. Contusion, also, may increase the inflammation, or induce suppuration. Wounds of tendons are generally tedious, and when cured, are often followed by a loss of substance, and a want of mobility in the parts. Compound fractures are sometimes hazardous—as also fractures near articulations, or of parts surrounded by large masses of muscles. Comminuted fractures are extremely tedious in their cure. Finally, fractures in young persons, and in those who are in good health, are more readily healed than in old persons, valetudinarians, and pregnant women. Wounds complicated with dislocations sometimes induce alarming symptoms, as also those in which an important nerve is divided. The prognosis however is favorable, unless serious symptoms supervene on the disease, and which are referable to it. Wounds of the arteries and veins are not at the present day considered dangerous by modern surgeons, if timely aid be afforded; but, under other circumstances, a wound of a large artery may prove fatal. The system may be injured, or so much blood may have been lost, as to render assistance of little value.* It is extremely rare, that wounds of the

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* "The complete effusions of bile, urine, and fœculent matter, prove uniformly fatal, by their quality inducing a destructive inflammation."—Travers on Injuries of the Intestines. London edit. p. 72.

It has been proposed to avert the evils arising from these fluids remaining in the cavities, by removing them by puncturing, as is practised in dropsical cases; and this I could suppose may be practicable in some cases, as where any very liquid fluid is to be got out, water for instance, or serum, may be drawn off by puncturing at the lower part of a cavity, where it may be lodged; but, in other instances, there would be but little to hope for from the operation. Bile, urine, fœces, and chyle are highly irritating in their nature; and though, which is very doubtful, we were enabled to remove them from the cavity, we should find it impossible to command the wounded gall-bladder, biliary duct, kidney, ureter, or intestine, from which they proceed, so that the operation would only be inflicting pain, without any rational hope of success, as they would be renewed as fast as they were removed; and as for blood, unless the puncture was made instantly, it would most likely coagulate, and in that form it would be impossible to get it through a small punctured hole;—making a large incision is, of course, quite out of the question; and blood, if like to find its way out at all, will do so through the hole through which the wound was inflicted.—Editor.

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* The following case may also occur. "J. Denton was indicted in September, 1813, at the Old Bailey, for the murder of C. Denton. He had struck her with a knife, and she lived a month thereafter. The medical testimony stated, that the wound had nearly divided the arteries of the arm—*it mortified, and she died in consequence.* He was condemned and executed."—Edinburgh Annual Register, vol. 6, part 2. p. 121.

There was a very interesting case came on before the Justiciary Court, during the autumn circuit, at Glasgow, in the year 1822. A man of the name of Pace, game-keeper to Lord Blantyre, was tried for the murder of a poacher, whom he shot so severely in the left arm, that it was found necessary to amputate it above the elbow. The man died of erysipelis phlegmonoides in the right leg, and the question on the trial was, whether the erysipelis was brought on by the wound or not. Upon this question the medical men differed totally. Mr. John Burns, the most eminent surgeon in Glasgow, gave it as his opinion, that the debility caused by the wound brought on the disease of which he died. Dr. John Thompson, of Edinburgh, was of opinion, that it was brought on long before he received the wound. It appeared in evidence, that the poacher had been out in the exercise of his vocation for two nights, and had slept without shelter; that during that time he had eat but little; and, above all, that he had a foul ulcer in his leg, the absorption from which undoubtedly laid the foundation of the disease before the injury was received. Under all these circumstances, what could have been the best mode of treatment in such a case, supposing he had received no wound at all? Undoubtedly, the very treatment he did receive in consequence of it—copious bleeding, light diet, being kept quiet and still; and the counter irritation of the amputation, so far from increasing the inflammation which was going on in the groin, must have acted like a blister, or a seton, in repressing and counteracting it. This appears to me to be the rational view of the case, and in this view the jury saw it, for the prisoner was acquitted.

There are some wounds more apt to produce serious effects in different parts of the body than others. Thus, a cut in the adductor muscle of the thumb, (that muscle which lies it in the palm of the hand) more frequently brings on lock-jaw than an injury of equal extent any where else. While on the subject of lock-jaw, which must be looked upon as a spasmodic action of the muscular system generally, rather than a mere contraction of the temporal muscle only, which is merely a symptom of the disease, I may remark that a predisposition to this is brought on by particular climates, especially within the tropics, which could not, *à priori*, have been expected. When the expedition sailed from England to Buenos Ayres, in 1807, in the hospitals of most of the regiments employed there, lock-jaw was a very frequent effect of a wound in any part of the body. The same troops went to the Cape of Good Hope, where no such effects ever appeared at all. The 89th regiment went from that to Ceylon, where no lock-jaw ever followed a wound; and thence to Java, where it was the cause of death in two-thirds of the wounds. Here we have four hot climates, two of them notoriously unfavourable to Europeans, and two of them the healthiest that we know of, and yet the tetanus took place in South America and Java, and was not to be found in Ceylon or the Cape. The former quite as unhealthy generally as Java can possibly be.

A fall from a height, or a sudden blow, may produce laceration of a joint, and whenever this takes place, and terminates fatally, such an event must be attributed to bad habit of body, or the pre-existence of some irritating disease; in which case, should it be made the subject of judicial enquiry, it is the duty of both the lawyer and surgeon to make minute investigation into the patient's previous health and habits. It is seldom, however, that it comes under the investigation of a criminal veins prove dangerous, except the brachial or femoral ones be wounded near the trunk. Wounds of the articulations are generally to be dreaded, and the apprehension is increased when they are complicated; as, for example, with contusion, hæmorrhage, or fracture.

Finally, the prognostic from wounds from fire-arms, is, in all cases, more serious than that of wounds from cutting instruments.*

Such are, in as short a space as possible, the various prognostics of the numerous wounds (in a medico-legal sense) to which the body is liable. But I must again remark, in this place, that these or similar rules are not to be taken as infallible guides. It is only to aid the examiner in pronouncing an opinion, that they deserve any attention, and he should rely principally on the circumstances of the case that is immediately before him. "It has indeed been argued, that it is not enough to say, that the person died of the wound, but that the wound must be characterised as mortal, thus taking advantage of the systematic arrangement in books on surgery, and deducing the conclusion, that when a man dies of a wound that is not there arranged as mortal, it must have originated from bad treatment, or misconduct, or irregularity on the part of the patient.† But the insufficiency of these divisions has been often proved. Thus, "in a case of one John Shaw, at the Scotch bar, three physicians and two surgeons swore, that, by the rules of their prognostics, the wounds received by James Houston were mortal; whereas Houston was alive, and the plaintiff in the very cause in which these gentlemen gave this testimony."‡

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court, at least, in so far as its causing death; but in civil cases it is often tried, as in the upsetting of coaches, &c. There was a case of this kind recorded some time ago in the newspapers, where the plaintiff, a gentleman, who had been upset in a coach, recovered 800*l.* damages against the defendant, a surgeon, for unskilful treatment of a dislocation of the shoulder-joint, by which the plaintiff was partially deprived of the use of his right arm. In all similar cases, almost a similar verdict would be just, for though there may be exceptions, yet, generally speaking, permanent lameness after a luxation (unless from disease of the bone anchyloses have taken place after it is put in its proper position) may be fairly attributed to mismanagement on the part of the surgeon.—EDITOR.

* The authorities on which this section is founded, are Bohn, Foderè, and Mahon. The two last are in many respects a copy of the former. I have also consulted Samuel Cooper's Surgical Works, Dorsey's Surgery, and Charles Bell's Operative Surgery, together with Metzger and Belloc, and the various dissertations in Schlegel.

† Lawyers are very apt to push the question, as to the mortality of wounds, to a considerable length, and by this means endeavour to embarrass the medical witnesses. I recommend the answer of the surgeon who deposed on the trial of Count Koningsmark, for the murder of Mr. Thynne, to the notice of the latter. Mr. Thynne was shot with a blunderbuss, and Mr. Hobbs, the surgeon, swore that he had examined the body after death—that four bullets had entered it—" that they tore his guts, and wounded his liver, stomach, and his gall—wounded his great guts and his small guts, broke one of his ribs, and wounded the great bone below."

Sir Francis Withens. Did he die of those wounds?

Mr. Hobbs. Yes, he did die of those wounds.

Mr. Williams. Did you apprehend them all mortal, or any, or which of them?

Mr. Hobbs. *I believe there never was a wound but it might prove mortal.*—Hargrave's State Trials, vol. 3, p. 473.

‡ Edinburgh Med. and Surg. Journal, vol. 1, p. 389.

When a surgeon is called on to examine a wound, the effects of which may become the subject of a criminal trial,* he should ascertain, 1st, whether it has been already dressed, or if some surgeon has not been attending to it; and 2d, whether the situation of the wounded person allows of an examination. Both these are important, as much may depend on the skill and care with which the first dressing has been made; and again, should an examination take place while the patient is in a feeble state, and death follow during it, popular opinion will certainly attach great blame to the surgeon. The juridical examination of a wounded person must also be deferred in some cases, where the point or part of an instrument remains in the wound. Here a consultation is frequently required, to determine on the propriety of its removal; and the question has often arisen, whether the death of the patient will not be hastened by immediately withdrawing it.

Let us, however, suppose the wounded person to be in a fit situation for the surgical and juridical examination. It is then necessary, before proceeding to it, to ascertain the nature and shape of the instrument by which the injury was inflicted. Enquiry should also be made as to the relative situation of the parties at the moment of the wound—their respective stature, and position.† The examiner cannot be too minute, and he should be cautious in not making any observations on the nature of the wound, before he has fully satisfied his own mind, lest they may hereafter be used to the disadvantage of his evidence. The form, length, breadth, depth, and direction of the injury, together with all the other circumstances already mentioned, should be noticed, and a detailed summary of the whole should then be drawn up in the form of a report. I must, however, caution concerning the impropriety, and indeed inutility, of declaring any wound, concerning which there can be the least doubt, absolutely mortal. All that can be required by judicial officers, is a declaration that, in the opinion of the examiner, the life of the wounded person is in danger from the injury he has received; and on this they are sufficiently enabled to take all the precautionary steps that may be necessary. During the illness, it will be proper to keep a journal, and if the event prove fatal, we have a safe guide to resort to. In dissection, the wounded parts must be minutely examined, and from them a just conclusion can be drawn whether the injury was the cause of death.*

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* I mention the following case, as it may be important for the surgeon to be aware of the doctrine contained in it. In the case of The King *v.* Salisbury, the prisoner was committed to Newgate for stabbing a gentleman with a knife, so that his life was despaired of. She moved that a physician and surgeon of her own nominating might be permitted to be present at the dressing of his wound, so as to be able to satisfy the court that he was out of danger, in order that they might bail her. *Sed per curiam.* There never was a motion of this nature, especially so early as this. The course is for the friends of the party injured to lay his condition before the court, when they oppose the bailing; if they do not do it, we may order such an attendance for our own satisfaction; but, at present, the defendant has no right to demand it.—1st Strange's Reports, p. 547.

† It has at various times been a subject of anxious discussion, whether there are any proofs to be drawn from the nature of the wound, discriminative of the injured individual falling on the weapon, or of its having been thrust into him. This question was put to the Medical Faculty of Giessen, in 1685, in the case of a wound of the breast, and they decided, from *accompanying* circumstances, that the former was probable.—Valentini's Pandects, vol. 1, p. 240. In a late trial in England, of an officer of the guards, for the murder of a private, two surgeons deposed, that from the nature of the wound they would take it upon themselves to declare, that it must

It is not necessary, in this place, to state the distinctions that exist in our law and that of England, respecting the crime of killing, since they relate to the intent, and can have but a slight bearing on the nature of wounds. There is one English statute, however, which deserves mention. It was passed in the reign of James I. and declares, " that the thrusting or stabbing another, who has not a weapon drawn, or who hath not then first stricken the party stabbing, *so that he die thereof within six months after*," shall be adjudged murder, though done upon sudden provocation.† In the state of New-York, the same statute has been enacted, and it contains the same provision as to time, *(six months.)* It is to be deemed murder, " although it cannot be proved that the same was done of malice aforethought."‡

This provision as to a specific period of time, during which death must follow, in order to constitute the crime of murder, appears to have entered into the laws of various countries. Thus, among the Lombards, the criminal was held guilty if the individual injured died within a year.§ In Prussia, on the contrary, the *practice* is, that the death must take place within nine days, although the *penal code* of that country contains no directions respecting this subject.‖ In France it is fixed at forty days;¶ while, in England, the individual was held amenable for the consequences during a year and a day.** All these restrictions are evidently improper, since death may follow at a longer or shorter period of time, and be strictly and indisputably traced to the wound in question. It is a much safer mode to look at the intent, and proportion the punishment accordingly.

3. *Of Mutilation.*

It will readily occur to the reader, that there may be many wounds which, though not mortal in their nature, are still incurable, and these may either leave permanent deformity, or incapacitate or weaken one or more of the functions of the body. Laws directed to the punishment of such injuries have accordingly been enacted in various countries, and as some are in force in this state, the propriety of a brief notice is evident.

I will commence by mentioning those in force in France, as there is a uniformity between the English law and our own.

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have been inflicted by the body falling upon the sword, and not occasioned by a thrust of the weapon.—London Med. and Phys. Journal, vol. 31, p. 467. The grounds on which they formed this opinion are not stated.

* Foderè, vol. 3, p. 402 to 432.

† Blacksone, vol. 4, p. 193.

‡ Revised Laws, vol. 1, p. 67.

§ Bohn, p. 101.

‖ Metzger, p. 325.

¶ Ballard, p. 325.

** Blackstone, vol. 4, p. 197.

The côde of 1791 established a scale, founded on the proportionate magnitude of the injury. Whenever an individual was so wounded as to be unable to apply himself to any manual labour for the space of forty days, the criminal was directed to suffer two years imprisonment. Three years were appointed in case the arm, leg, or thigh was broken; and four years, when there was an absolute loss of sight in one eye, a complete loss of the use of a member, or a mutilation of some part of the head or body. It was extended to six years, provided there was an absolute blindness, or a total inability to use either both arms or both legs.*

The code now in force does not contain these distinctions, but leaves to the judges the power of varying the period of imprisonment. It is, however, in one respect, more severe than the former, as it prescribes imprisonment generally against the individual who shall, either by wounds or blows, injure a person, so that he is ill, or unable to labour, for the space of twenty days thereafter. And this imprisonment is to be not less than five, nor more than ten years.† One species of mutilation is, however, particularly noticed, viz. castration. It subjects the criminal to hard labour for life, and if it should prove fatal within four days, he is to suffer death. Outrages against decency are alone to excuse from this punishment.‡

In the English law, the term *Mayhem* is applied to the cases now under notice. This is defined by Blackstone to be "the violently depriving another of the use of such of his members as may render him the less able in fighting either to defend himself, or annoy his adversary. And, therefore, the cutting off, or disabling, or weakening a man's hand or finger, or striking out his eye or fore-tooth, or depriving him of those parts, the loss of which in animals abates their courage, are held to be mayhems. But the cutting off his ear or nose, or the like, are not held to be mayhems at common law, because they do not weaken, but only disfigure him."

"By the common law also, mayhem has for a long time been only punishable with fine and imprisonment, unless perhaps the offence of mayhem by castration, which all our old writers held to be felony; and this, although the mayhem was committed upon the highest provocation."§

Subsequent statutes have, however, more clearly defined the crime and its punishment. By a statute passed in the 5th year of Henry IV. it was enacted, that the beating, wounding, or robbing a man, and then cutting out his *tongue*, or putting out his *eyes*, shall be considered a felony. Next, was the statute 37 Henry VIII. which directs, that if a man shall maliciously or unlawfully cut off the *ear* of any of his Majesty's subjects, he shall not only forfeit treble damages in a civil suit, but ten pounds by way of fine to the king, which was his criminal amercement. After this was passed the Coventry act, in the reign of Charles II. and so called from its being occasioned by an assault on Sir John Coventry in the street, and slitting his nose, in revenge (as was supposed) for some obnoxious words uttered by him in parliament. This ordains, that if any man shall, of malice aforethought, and by lying in wait, unlawfully cut out, or disable the *tongue*, put out an *eye*, slit the *nose*, cut off a *nose* or *lip*, or cut off or disable any *limb* or *member* of any other person, with an *intent to maim or disfigure* him, he shall be deemed a felon without benefit of clergy.*

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* Foderè, vol. 3, p. 427. † Ibid. p. 428.

‡ Foderè, vol. 3, p. 244.

§ The ancient Anglo-Saxon laws contained a regular scale of fines for personal injuries of this description. The loss of a leg or eye, subjected the offender to a fine of fifty shillings; a wound that caused lameness, thirty shillings; one that caused deafness, twenty-five shillings; piercing the nose was punished with a fine of nine shillings; a front tooth was compensated for by six shillings, and an eye-tooth by four shillings. Money, it must be remembered, was in those days one hundred times more valuable than at present.—Edin. Encyclop. vol. 2, p. 94. Amer. edit.

The law in the state of *New-York* is taken from several of the above. As it is short, I will quote it at length. It enacts "that if any person shall on purpose, and of malice aforethought, cut out the tongue, or put out the eyes, of any other person, or if any person shall on purpose, and of malice aforethought, and by lying in wait, unlawfully cut out or disable the tongue, put out an eye, slit the nose or lip, or cut off or disable any limb or member of any other person, with intent in so doing to murder or kill, or to maim or disfigure, in any of the manners aforesaid, every such offence shall be deemed and adjudged felony."† And by another law, the punishment for the crime is directed to be imprisonment in the state-prison for life.

Some interesting decisions have been made in England under the Coventry act, and as they are applicable to our own, should similar cases occur, I will mention a few.

In 1721, Mr. Coke, a gentleman of the bar, and one Woodburne, were indicted, the one for hiring and abetting, the other, for actually slitting the nose of Mr. Crispe, the brother-in-law of Coke. On the trial, Mr. Sturgeon, the surgeon, swore that there were several wounds on the face; one wound divided the right side of the nostril, and made an oblique cross over the wound, and ended near the right under-jaw. The nose was cut from without into the nostril, the edge of the nose was not cut through, but there was a cut or slit in it, that went through. Mr. Coke, with great effrontery, said, that his aim was to murder, and not to maim or disfigure. When the verdict of guilty came in, he asked whether the nose could be said to be slit, within the meaning of the statute, when the edge of it was not cut through. To this, the lord-chief-justice (Sir Peter King) replied—"It is true, the edge of the nose was not slit, but the cut was athwart the nose, which cut separated the flesh of the nose, and cut it quite through the nostril. This I take

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* Blackstone, vol. 4, p. 205-206-207.

† Revised Laws, vol. 1, p. 168. A law similar to the above, in many respects, was passed in England, in the 43d of George III. All wilful or malicious stabbing or cutting, with intent to murder, rob, *maim, disfigure, or disable, or to do some grievous bodily harm,* is declared felony.

(he added) to be a slitting of the nose, and *the surgeon swore the nose was slit.*" Both Coke and Woodburne were executed.*

In the case of one Carrol, at the Old Bailey sessions, in July 1765, it appeared that he had struck the prosecutor, (Mr. Kirby,) with a razor bladed knife, across the nose and eyes—and upon examination, it appeared that the two great blood-vessels in the forehead were divided—that there was a large transverse wound across the nose, so wide open that the bone was visible. It began from the right, and went across the eyelids and across the nose. The muscles of the nose were cut through, and it proceeded to the left eyelid, and terminated at the temple. A nerve was also cut. It was stated in evidence, that in many old writers on surgery, such wounds are called slits, but that slit is not a word made use of now. The word *slit* is understood as synonimous to the word *cut;* but the idea which was formerly conveyed by the word *slit* is now expressed in speaking technically, by the word *divided.* The jury found the prisoner guilty, but it was questioned whether a transverse cut was a slitting, within the meaning of the act, *the wound not having perforated the nostril.* It was accordingly referred to the judges, who held that the offence was properly proved, and the prisoner was accordingly executed.†

Lastly, one Tickner was tried, in 1778, at the Old Bailey, under the same act, for injury done to William Jacob. There were several wounds on various parts of the body, but the cut on the nose had divided the integuments in an oblique direction. It went down to the bone, but not through the bones of the nostrils, nor did it penetrate to the nostrils, and was rather a scratch than a slit. It was, however, sufficient to leave a mark visible for some time. The prisoner was convicted, but Sergeant Glynn ordered the execution to be respited, until the opinion of the twelve judges could be procured, whether this conviction was proper within the meaning of the Coventry act. They were of opinion, that the conviction was right.‡

In *Connecticut*, it is enacted, that "every person who shall of malice aforethought, and by lying in wait, cut out or disable the tongue of another, or put out the eye or eyes of another, so that the person is thereby made blind, or cut off all or any of the privy members of another, and shall be thereof duly convicted, shall suffer death.

"Every person who shall of malice aforethought put out an eye, slit the nose, cut or bite off the nose, ear, or lip; or cut, or bite off or disable any limb or member of another person, with an intention in so doing to maim or disfigure such person, and shall be thereof duly convicted, shall suffer imprisonment for life, or such term of years as the court may direct."§

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* Hargrave, vol. 6, p. 211.

† East's Treatise, p. 399. Lawyer's Magazine, vol. 1, p. 202.

‡ Lawyer's Magazine, vol. 1, p. 203. William Lee was tried at the Old Bailey in 1763, for attempting to *cut his wife's throat* with a razor while asleep. The wound was three inches in length, and quite across, but did not prove mortal. This was held not to be an offence within the Coventry act.

§ Revised Laws, 1821, p. 151-152.

In *New-Jersey*, *New-Hampshire*, *Massachusetts*, *Rhode-Island*, and *Pennsylvania*, the laws are similar to the one in New-York, and the punishments are fine or imprisonment, or both.*

In *Vermont*, the only crimes of this description specified, are cutting out the tongue, putting out the eyes, or cutting off the privy parts, and the punishment may be imprisonment for life, or a large fine.†

In *Delaware*, the crimes included in the Coventry act were, by a colonial law, made punishable by death, and I cannot find that this has been repealed.‡

CHAPTER XV.

POISONS.

Definition of a poison—Remarkable resistance sometimes observed to the action of poisons—in individuals—in animals. Modes in which poisons may be introduced into the system. Division of poisons—division proposed by Foderé, and adopted with modifications by Orfila. 1. SIGNS OF POISON ON THE LIVING BODY. Symptoms of the corrosive or acrid poisons—the narcotic—narcotico-acrid—astringent—Causes that may modify or vary the progress of symptoms. Preliminary directions for the analysis of suspected substances—Insufficiency of chemical analysis, in poisoning by vegetable substances—Exhibition of the suspected substance to animals. Directions of Orfila on this point. Of poisoning during illness. Of slow poisons—of poisons administered to several persons at the same time—variety in their effects. Of poisoning as the result of suicide or homicide. Diseases and symptoms that may be mistaken for the effects of poison—idiosyncracy—indigestion—sudden illness. 2. SIGNS OF POISON ON THE DEAD BODY. Rules for dissection. Appearances on dissection from the corrosive poisons—the narcotic—the narcotico-acrid—and the astringent—Variety in these. How far the presence of putrefaction affects the value of dissections. Of the introduction of poisons into the body after death—Appearances indicative of this. Slow poisons. Appearances observed on dissection in certain diseases, which may be mistaken for poison—in cholera morbus—repelled eruptions. Phenomena that may be mistaken—the vascularity of the stomach—digestion and perforation of the stomach—Rupture of the stomach.

"THE means of ascertaining the traces of poisons, either on the living or the dead body, is one of the most important subjects in legal medicine, and its importance is only equalled by its difficulty."

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* Revised Laws, New-Jersey, 1821, p. 259. Laws of New-Hampshire, 1797, p. 279. Laws of Massachusetts, 1807, vol. 3, p. 288. Laws of Rhode-Island, 1798, p. 589. Laws of Pennsylvania, 1803, vol. 5, p. 3. With reference to Massachusetts, see also the case of the Commonwealth *v.* Newell and others. Massachusetts Reports, vol. 7, p. 245.

† Laws of Vermont, 1808, vol. 1, p. 334.

‡ Laws of Delaware, 1797, p. 69.

I propose to consider the subject under three general divisions.

1. The signs of poison in the living body.
2. The signs of poison on the dead body.
3. The various kinds of substances that may, or have produced these dangerous and fatal effects.

Previous to an examination of these, a few preliminary observations will be proper.

What is a poison? The ancients considered every thing as poisonous, that produced malignant symptoms, and attacked directly what we style the vital principle. Thus, miasma was with them a poison, and their remedies, or antidotes, were accordingly directed to the support and cherishing of the vital heat, and to increase action throughout the body. Hence also the name of alexipharmics, and the belief of driving out poison by transpiration. The common idea of a poison by the moderns, on the other hand, is that it is a substance which, on being applied in one or other way to the human body, is capable of destroying the action of the vital functions, or of placing the solids and fluids in a situation that prevents the continuance of life. Dr. Mead's definition includes every substance which, in small doses, can produce great changes on the living body. This is evidently too extensive, since it embraces many articles that are not regarded as poisons, and excludes others that are really so. Thus, a small quantity of bread or water has produced great changes, whilst opium or corrosive sublimate has been taken in large quantities, without injurious effects. The definition given by Foderè, although liable to criticism, is probably as unexceptionable as any that has yet been offered. He considers poisons to be those substances which are known by physicians as capable of altering or destroying, in a majority of cases, some or all of the functions necessary to life.* The great and leading object in medico-legal cases, necessary to complete the idea of a poison, is the intent with which the substance is given.

Another interesting question is, the manner in which poisons act. This has been a subject of fruitful discussion among modern physiologists, and our own country has not been wanting in ardent examiners respecting it.† It is not necessary, with reference to the science of medical jurisprudence, to enlarge on the varied results obtained by experimentalists, nor to enter into a discussion concerning the weight of testimony in favour of the blood-vessels, the nerves, or the lymphatics, as the medium by which poisons produce their effects. A concise notice of the consequences observed from each individual poison will be more appropriate to the object of the work, and this will accordingly find its proper place in the third division of the subject.

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* Foderè, vol. 3, p. 449.

† See Ducachet's Inaug. Dissertation on the Action of Poisons. Somerville's Inaug. Dissertations on the Organs of Absorption. (Chapman's Journal, vol. 2, p. 408.) Report of the Committee of the Academy of Medicine, on the Means by which Absorption is effected. Ibid. vol. 3, p. 282. Dr. Milnor's Experiments. Ibid, vol. 4. p. 10. Dr. Hubbard's Experiments. Ibid. vol. 4, p. 242. Drs. Lawrence and Coate's Experiments. Ibid. vol. 5, p. 327. Also Dr. Hale's Boylston Prize Dissertation.

The remarkable resistance that is sometimes observed to the action of poisons, also deserves an early allusion. Instances of this nature are so numerous, that a selection of the more striking will be sufficient to illustrate the position.

Among the Hungarians, the seeds of the *Palma Christi* are often taken, to the amount of thirty-six grains, without any inconvenience, and some of the French peasantry use a decoction of *colocynth* as a common purgative. The common dose of the extract of the *aconitum napellus* is one or two grains, and it is deemed dangerous to use it in larger quantities; but Foderè was consulted concerning the case of Charles IV. of Spain, who, while residing at Marseilles, was attacked with a rheumatic gout, and he recommended the medicine in question. M. Soria, the king's physician, replied, that, at a former period, it had been administered for a length of time, and to such an extent, that the patient took a drachm daily, without any good or evil effects. This monarch was now sixty-two years of age, athletic, and had an excellent appetite.* The fumes of mercury, of lead, and of copper, are well known to be injurious to those who inhale them, yet no fact is better established than that of workmen resisting their effects for many years. "In the mines of Peru," says Humboldt, "from five to six thousand persons are employed in the amalgamation of the minerals, or the preparatory labour. A great number of these individuals pass their lives in walking barefooted over heaps of brayed metal, moistened and mixed with muriate of soda, sulphate of iron, and oxide of mercury, by the contact of the atmosphere and the solar rays. *It is a remarkable phænomenon,*" he adds, "*to see these men enjoy the most perfect health.*"† Again, in all the Savoyard and Swiss Alps, milk is collected and kept in small copper vessels; and, in Germany, preserved fruits are put into vessels of this metal, in order to give them a green colour, and all without inducing any injury.‡ The most astonishing of cases, however, on record, is that of the old man at Constantinople, who had been in the habit, for thirty years, of swallowing enormous quantities of corrosive sublimate, until his dose came at last to be a drachm daily. He was living in 1800.§

These exceptions to general rules are best explained on the principle of idiosyncrasy, or of habit rendering the system innoxious to their effects.|| And such extraordinary instances should, above all, never

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* Foderè, vol. 3, p. 468.

† Francis' Inaugural Dissertation on Mercury, p. 27.

‡ Foderè, vol. 3, p. 449.

§ This case was first mentioned by Dr. Pouqueville. Mr. Thornton doubted the story, and criticised the name given him. Lord Byron, in the notes to his Childe Harold, attacked Mr. Thornton in his turn. And thus "this man, (says Mr. Hobhouse) though nearly one hundred years old, was, like Partridge, the almanackmaker, almost reasoned out of existence by a verbal criticism, which has turned out to be incorrect."—Hobhouse's Albania, vol. 2, p. 945. Lond. edit.

|| The quantity of opium taken daily by many of the Turks, is also a striking proof of this.

influence us in legal medicine, nor lead us to the idea, that because one person has taken a particular substance without any ill effects, it is, therefore, not a poison. The academy of Berlin was consulted, in 1752, whether copper was a poison. They replied, that they did not consider it decidedly so, since several had taken it with impunity, either separately or mixed with food. Now, if this decision receives a general application, we may undoubtedly adduce examples of wonderful escapes from the effects of almost all noxious substances, and thus destroy the idea of poison altogether.*

There is another curious fact connected with this subject, which it is proper to mention. It is, the different effects which some substances produce on man and other animals—being noxious to the one, and innoxious to the other, and vice versa. Thus, sweet almonds kill dogs, foxes, and fowls—aloes is destructive to dogs and foxes, pepper to hogs, and parsley to the parrot. On the contrary, the leopard's bane (arnica montana) is fatal to man, while it is food for wild goats and swallows. Hogs feed on henbane, (hyoscyamus)—pheasants on stramonium, and sheep on hemlock and the manchineal apple with impunity. Even arsenic is said to prove harmless to the wolf.†

The danger of poisons, as well as the rapidity of their action, varies considerably. Animal poisons are probably the most speedily and the most certainly fatal, though they would seem to be equalled in both respects by some of the vegetable poisons, when introduced by puncture into the system. I refer particularly to the poisoned arms of savage nations. Next, the mineral, and lastly the vegetable poisons. The latter, though generally slower in their operation, are often no less destructive.

Poisons may be introduced into the system in various ways: through the nose, in the form of odours—through the lungs, by inspiration—by the mouth and œsophagus, in the form of food—by the anus, in the form of injection, and through the skin by absorption.‡

In noticing individual poisons, two modes of arrangement have been pursued by various writers; the one founded on the basis of natural history, and the other upon the action of these substances on the living system. The latter has of late years been most generally adopted by authors on toxicology, with however great variety as to their classification. There are, however, some objections to following it implicitly in a work on medical jurisprudence, since, in addition to its allowed incompleteness, it is arranged principally on a view of symptoms.* These, though highly important, are but a part of the objects of investigation in the science under consideration.

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* Foderè, vol. 2, p. 470.

† Foderè, vol. 4, p. 208. Mahon, vol. 2, p. 302. Ducachet, p. 20. Beckmann, (vol. 1, p. 52) says, that four drachms of sugar given to a pigeon, killed it in four hours; and five drachms, a duck in seven hours.

‡ Foderè, vol. 3, p. 481. There are many curious accounts on record of the mode in which poisoning was supposed to have been perpetrated. Thus Zacchias says, that Pope Clement VII. was poisoned by the smoke of a candle, and it has been supposed that dresses and jewels might be impregnated with venomous matter. Queen Elizabeth was to have been poisoned by spreading some on the pommel of the saddle. "The queen, in mounting, would transfer the ointment to her hand; with her hand, she was likely to touch her mouth or nostrils, and such was the virulence of the poison, that certain death must follow."—Aikin's Memoirs of Queen Elizabeth, Amer. edit. vol. 2, p. 306. There is a minute of council extant, in the hand-writing of Cecil, which contains, among other things, the following caution: "That no manner of perfume, either in apparel, or sleeves, gloves, or such like, or otherwise, that shall be appointed for your majesty's savor, be presented by any stranger, or other person, but that the same be corrected by some other fume."—Ibid. vol. 1, p. 299.

It is, notwithstanding, practicable, I apprehend, to combine both in such a manner as to increase their respective utility. Nearly all the corrosive poisons, for example, of Foderè and Orfila, belong to the mineral kingdom, and the septic to the animal, while the acrid, narcotic, and narcotico-acrid, divide the vegetable kingdom. I propose, therefore, to follow the natural history method generally, and when we arrive at vegetable poisons, consider them under the above division, taking care, at the same time, to mention any individual substance in the other kingdoms which differs in action from its associates.

The division of poisons, proposed by Foderè, and adopted and modified after him by Orfila, may be introduced in this place. It contains six classes, viz.

The Corrosive or escharotic,
Astringent,
Acrid,
Narcotic or stupifying,
Narcotico-acrid,
Septic and putrefying.†

The substances belonging to each, are as follow:

CLASS I.

Corrosive or Escharotic Poisons.

- *Arsenical* Preparations.
  - Arsenious acid, or white oxyd of arsenic
  - The arsenites
  - Black oxide of arsenic, fly-powder
  - Arsenic acid
  - Arseniates of potash, soda, and ammonia
  - Yellow and red sulphurets of arsenic
- *Mercurial* Preparations.
  - Corrosive sublimate
  - Nitrate of mercury
  - Red precipitate
  - Red oxyd of mercury, (precipitate *per se*)
  - Sulphate of mercury, (turbith mineral)
  - White precipitate
  - Mercurial vapours;
- *Antimonial* Preparations.
  - Oxide of antimony
  - Tartar emetic
  - Antimonial wine
  - Muriate of antimony
  - Kermes mineral, beyond medical doses
  - Golden sulphur of antimony, do.
  - Cinnabar of antimony, &c.
  - Antimonial vapours

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* "The arrangement of M. Foderè is rather calculated for a *natural history of poisons*, than to elucidate this branch of juridical medicine."—Edin. Med. Jour. vol. 1, p. 339. See also Smith, p. 66.

† In his manual, entitled "*Directions for the Treatment of Persons who have taken Poison*, &c." Orfila has somewhat modified this division. The arrangement there is as follows: *Irritating*, or those which produce inflammation of the parts to which they are applied. And under this, he includes the preparations of lead, thus virtually abolishing the class of astringent poisons, except so far as relates to saturnine emanations. He also includes, under this, the acrid vegetable poisons. This, indeed, he virtually did in his toxicology. 2. *Narcotic.* 3. *Acrid narcotic.* 4. *Septic.*

- *Copper.*
    - Oxide of copper
    - Sulphate of copper
    - Nitrate of copper
    - Muriate of copper
    - Acetate of copper
    - Ammoniacal copper
    - Coppery soaps
    - Coppery wine
- *Silver.*
    - Nitrate of silver.
- *Gold.*
    - Muriate of gold
    - Fulminating gold
- *Zinc.*
    - Oxide of zinc
    - Sulphate of zinc
- *Bismuth.*
    - Nitrate of bismuth
    - Sub-nitrate of bismuth
- *Tin.*
    - Muriate of tin
    - Oxides of tin
- *Acids,* concentrated, and in particular.
    - Sulphuric acid
    - Nitric acid
    - Muriatic acid
    - Phosphoric acid
    - Fluid nitrous acid
    - Sulphureous acid
    - Fluoric acid
    - Phosphorous acid
    - Oxalic acid
    - Tartaric acid.
- *Alkalies,* caustic.
    - Potash
    - Soda
    - Ammonia
- *Alkaline carbonates in large doses.*
- *Caustic alkaline earths.*
    - Barytes, and its salts
    - Quicklime
    - Phosphorus
    - Glass and enamel in powder
    - Cantharides
    - Iodine
    - Hydrogenated sulphuret of potash.

CLASS II.

Astringent Poisons.

- *Lead.*
    - Acetate of lead
    - Carbonate of lead, cerusse
    - Litharge
    - Wines and water impregnated with lead
    - Food cooked in leaden vessels
    - Syrups and spirits clarified with acetate of lead
    - Saturnine emanations.

CLASS III.

Acrid Poisons.

- Chlorine
- Fluid chlorine
- Nitrous acid gas
- Sulphureous acid gas
- Nitrate of potash
- Veratrum album, white hellebore
- Helleborus niger, black hellebore
- Bryonia Dioica
- Elaterium
- Colocynth
- Gamboge
- Daphne Gnidium, spurge flax
- Daphne Mezereum, &c.
- Ricinus communis
- Euphorbia officinarum, and several other species
- Savine
- Rhus radicans
- Rhus toxicodendron
- Rhus vernix
- Anemone pulsatilla, &c.
- Aconitum napellus, &c.
- Chelidonium majus
- Delphinium staphysagria
- Narcissus pseudo-narcissus
- Œnanthe crocata
- Gratiola officinalis
- Jatropha curcas
- Scilla maritima
- Sedum acre
- Ranunculus flammula, and several other species
- Rhododendron chrysanthum
- Fritillaria imperialis
- Pedicularis palustris
- Cyclamen europæum
- Plumbago europæa
- Colchicum autumnale
- Scammony
- Cerbera ahovai
- Cynanchum erectum
- Lobelia syphilitica
- Apocynum androsœmifolium, and other species
- Asclepias gigantea
- Hydrocotyle vulgaris
- Clematis vitalba, &c.
- Pastinaca sativa annosa
- Scelanthus quadrogonus, and other species
- Phytolacca decandra
- Croton tiglium
- Arum maculatum, and other species
- Calla palustris.

CLASS IV.

Narcotic Poisons.

- Opium
- Hyoscyamus niger

Hyoscyamus albus, &c.
Prussic acid
Prunus lauro cerasus
Oil of laurel
Bitter almonds
Lactuca virosa
The solana
Taxus baccata
Actæa spicata
Physalis somnifera
Azalea pontica
Ervum ervilia
Lathyrus cicera
Paris quadrifolia
Nitrogen gas
Nitrous oxide.

CLASS V.

Narcotico-acrid.

Atropa belladonna
Datura stramonium, &c.
Tobacco
Digitalis purpurea
Anagallis arvensis
Aristolochia clematitis
Conium maculatum
Cicuta virosa
Œthusa cynapium
Ruta graveolens
Nerium oleander
Upas Tieuté
Nux Vomica
Bean of St. Ignatius
Angustura pseudo-ferruginea
Upas antiar
Ticunas
Woorara
Camphor
Cocculus indicus
Poisonous mushrooms
Alkohol
Sulphuric æther
Carbonic acid gas
Gaseous oxide of carbon
Ergot, spurred rye
Lolium temulentum
Hippomane mancinella
Mercurialis perennis
Chærophyllum sylvestre
Sium latifolium
Coriaria myrtifolia
Odours of the above plants.

CLASS VI.

Septic or putrefying Poisons.

Sulphuretted hydrogen gas
Putrefied substances
Viper
Venomous snakes
Scorpion
Tarantula
Sting of bees, wasps, &c.
Poisonous fishes
Muscles
Malignant pustule
Rabies.

1. *Signs of poisons on the living body.*

A person is supposed to be poisoned, if, being in perfect health, he is attacked, after having taken some food or drink, with violent pain, cramp in the stomach, nausea, vomiting, convulsive action, and a sense of suffocation; or, if he be seized, under the same circumstances, with vertigo, giddiness, delirium, or unusual drowsiness.*

All these symptoms may, however, be the effect of sudden disease, and the examiner should, therefore, recollect whether an epidemic or sporadic disease, resembling that of the patient, does not exist. He should also enquire into his strength, mode of life, and habit of body, and ascertain whether he had previously complained of ill-health. The time at which the noxious substance was taken, and the vehicle in which it was given—the taste or odour that was perceived on its administration, and the food or drink that has been lately swallowed, are all subjects that require particular notice.

Having formed an opinion, from a review of the above circumstances.

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* These are the most striking *preliminary* symptoms. Mahon has collected a long list from the older writers, which, however, includes most of the appearances observed during the whole progress of the action of poisons. It is evidently too general to be of much practical value.—See Mahon, vol. 2, p. 263.

that a poisonous substance has been taken, the next question that arises is, to what class it belongs. Although (as I have already remarked), the symptoms of poisons are somewhat equivocal and unsettled, yet there are certain leading and characteristic appearances which in a majority of cases serve to distinguish the two great divisions of poisons from each other. And these two are, the *corrosive* or *acrid* and the *narcotic.*[*]

We may suppose a corrosive or acrid poison to be the cause of present disease, if the patient has observed that the food or drink, which was its vehicle, had not its ordinary taste—if he has felt a heat, an irritation, or an extraordinary and sudden dryness at the root of the mouth and œsophagus, with a constriction or sense of strangling in those parts—if this be succeeded by an obstinate anxiety to vomit, and sharp pains in the stomach and intestines—if there be great thirst, copious discharges, by vomiting and by stool, accompanied with tenesmus and followed by hiccup, by a sense of constriction across the diaphragm, and a difficulty of breathing—if there be great pain in the region of the kidneys, followed by strangury—if convulsions, cramps of the hands, trembling of the lips, extinction of the voice, repeated faintings, cold sweats, and a small, chorded, and irregular pulse be present; and if, in addition to all these, the intellectual faculties remain perfect, until the disease arrives near its fatal termination.[†]

A narcotic poison, on the other hand, produces the following effects: Stupor, numbness, a great inclination to sleep, coldness and stiffness of the extremities, a cold sweat of a fœtid or greasy nature, swelling of the neck and face, protusion of the eye with a haggard cast of countenance, thickening of the tongue, frequent vertigo, weakened eye-sight, or objects presented to it, in a fantastic manner, coma, delirium, general debility, palpitation of the heart, the pulse at first full and strong, but afterwards unequal and intermittent, paralysis of the lower extremities, retraction of the lips, general swelling of the body, and dilatation of the veins. At the conclusion of the disease, slight convulsions and pain are sometimes present,[‡]

If we pursue the arrangement of Foderè, we shall find that the narcotico-acrid poisons are distinguished by a combination of several of the above symptoms. They are agitation, pain, acute cries, sometimes stupor and convulsive motions of the muscles of the face, jaws, and extremities—vertigo, and occasionally extreme stiffness of the limbs—and contraction of the muscles of the thorax—the eyes red and starting from their sockets, the pupils frequently dilated—insensibility to external impressions—mouth full of foam—tongue and gums livid—nausea, vomiting, frequent stools: often these symptoms attack in paroxysms, and the patient is left comparatively easy for a few moments.*

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[*] Although Orfila has followed the arrangement of Foderè, yet he explicitly states, that the *corrosive* and *acrid* poisons produce phænomena precisely similar. Vol. 2, p. 1 and 521.

[†] Foderè, vol. 4, p. 190. Orfila, vol. 1, p. 15, vol. 2, p. 98, 514. "In general," (says the last author,) "the patient preserves the use of his intellectual faculties during the first periods; but, a short time before death, he falls into a state of great insensibility and immobility, and is agitated by convulsive movements." He also mentions purple spots over the body, and a miliary eruption, as occasional symptoms of this class.

[‡] Foderè, vol. 4, p. 190. Orfila, vol. 2, p. 170, 515.

Lastly, astringent poisons, of which lead is the most striking, are characterized by severe gripings in the stomach and abdomen, occasional vomitings, incessant cough, and wasting or paralysis. The absence of fever, and the protracted nature of the disease, unless very large quantities have been taken, appear also to be distinctive marks.

It may appear easy, after this enumeration, to distinguish the nature of the poison that has been taken, but in ordinary practice it is, notwithstanding, very difficult. There are substances, very distinct in their characters, which produce similar effects; as, for example, cantharides, acrid vegetable substances, and caustic minerals. All these belong to the class of corrosives, and generally exhibit similar symptoms. The difficulty is increased, when it is recollected, that ordinary and innoxious substances, so far as concerns their poisonous nature, sometimes cause the most alarming symptoms. Foderè observes, that he has seen a roasted chesnut produce all the symptoms of poison, until a dose of tartar emetic dispelled its influence.†

On the other hand, a variety is frequently observed in the symptoms excited by the same poison, on different individuals. Many causes may conduce to this, such as the mode in which it is exhibited. A poison given in the liquid form is generally more rapid and marked in its effects than when it is exhibited in the solid state; and the substances, previously or subsequently taken, may also modify the symptoms. Instances of this variety are to be found in all authors on toxicology. Marc produced salivation in a dog, by giving him a large dose of opium; while sleep, the common consequence, was wanting.‡ So also Morgagni relates of a female, aged sixty, who had eaten a paste composed of milk and arsenic, which had been prepared for rats. She died in twelve hours after, but without having suffered any severe pains or convulsions. On dissection, however, her stomach was found eroded.§

I apprehend that the circumstance of the patient's vomiting or not vomiting, has the greatest influence on the course and variety of the symptoms. This is a subject to which I shall have frequent occasion hereafter to refer, but it may be remarked at present, that there are many persons who vomit very readily, whilst in others the act is very difficult, and almost causes convulsions. In the former case, the poison may be rejected before it has time to produce injurious effects; while, in the latter, death will be the inevitable consequence. And again, the poison, from the quantity taken, or from some other reason, may itself produce vomiting, and thus prevent the fatal termination. Dr. Petit, of Lyons, relates of a person who survived after taking half an ounce of arsenic, and he attributes this to the violent vomiting that ensued. Deschamps gives an account of a female who recovered after taking two drachms of tartar emetic, which was followed by vomiting; whilst another, who, by buying small quantities from different apothecaries, had obtained eleven grains of the same salt, died from using it.* It is probable that large doses produce their effects early and violently, and the stomach endeavours to reject them as soon as perceived, while small ones seem to have time to act not only on the system generally, but also on the structure of parts.

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* Orfila, vol. 2, p. 367, 516.

† I shall notice this point more particularly at the conclusion of the section.

‡ Foderè, vol. 4, p. 195.

§ Morgagni, vol. 2, epist. 59, p. 636.

A minute and accurate notice of symptoms is hence worthy of every attention, but it only forms the commencement of the enquiry in cases of supposed poisoning.

It is the further duty of the physician to examine every article of a suspicious nature, such as phials, boxes, or papers containing powders. These should be carefully put aside without remark. If the patient preserve his senses, we may obtain much necessary information from him, and possibly may also procure the remainder of the drink or substance that he has not completely taken. If this be impracticable, the matter vomited should be preserved, as also the linen or sponges used to collect the fluid which may have been deposited on the floor of the chamber, and a sufficient quantity should be sealed up, and reserved for the inspection of a competent chemist.

For a proper analysis of the matter vomited—of the matter found in suspected repositories, or the matter found in the stomach or intestines, or both, after death, the following preliminary directions require attention. Never make any experiments on the suspected substance without repeating them on ingredients that are deemed analogous, and in which the quantity of poisonous matter is ascertained. For this purpose, several solutions should be made of substances which it is supposed may probably resemble the poison given, and from the result, a comparison can be instituted. Again, the analysis should never be commenced until the tests are all prepared, and their accuracy determined. The order of proceeding should be previously laid down in the mind of the operator, and when ready, he should perform the experiments at one time. The risk of losing a part of the suspected substance, from employing inconclusive experiments, is thus avoided. Thirdly, if the quantity of matter received be sufficient, it should be divided into small portions, so that the various tests can be applied to each; but if there be only a very small quantity, the symptoms should be carefully considered, together with the indications they present, and an opinion should be formed as to the poison which most probably has caused the present disease. The tests applicable to it should then be employed. In pursuing this examination, it is of little importance, comparatively speaking, whether a decisive opinion can be formed as to the *quantity* administered: it is sufficient to prove the *nature* and *quality* of the substance.*

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* A still more striking case was mentioned in a Boston paper of the month of February, 1817. A man named *George Beals*, aged 21, and residing at Springfield, Mass. with an intent tod estroy himself, swallowed, at one draught, an ounce and a half of arsenic, immediately after having eaten a hearty supper of beefsteaks. He was seized instantly with violent vomiting, and was subsequently affected with spasm, but was restored to his usual health in three or four days. In about a month after, he destroyed himself yh aaging.

Chemistry can thus lend its aid in detecting mineral substances, but it is insufficient in determining whether a vegetable poison has been taken. In such instances, a conclusion should be formed from the train of symptoms that are present, and the substance itself may also be evaporated, to ascertain the presence of resin or extractive matter. This is generally all that botany or chemistry can do, since although the ultimate principles of vegetables be obtained, yet there is no certainty whether they belong to noxious or innoxious plants, except possibly in cases where the poison is of a ligneous nature, such as mushrooms, or where grains or berries are vomited.†

The kitchen-utensils should always be noticed, since it may happen that a copper-vessel badly tinned is the sole cause of these violent effects; and we should also remember, that the green colour which is frequently observed in the matter vomited, may be owing to vitiated bile, as well as to a mineral or vegetable poison.

It is an ancient direction, that part of the suspected substance should be given to some animal; in order to test its injurious nature. But the uncertainty of this proof has been shown in a former page, where it was mentioned, that many articles poisonous to man, are innoxious to animals; and it is therefore a point of considerable interest to ascertain on which of them it is most likely to produce effects similar to what it does on man. Physiologists generally recommend a dog as the subject, and Orfila says it should be a small, robust one, that is fasting. The suspected substance should not be put into his food, as is the ordinary practice, nor indeed should he be allowed to swallow it. This would produce the hazard of losing the whole by vomiting; and he hence advises, that the œsophagus should be detached, and perforated with a small hole. Into this a glass funnel is to be introduced, and the liquid poured through it into the stomach. The œsophagus is then tied below the opening. If the substance be solid, it should be put into a small paper cone, in order that it may be pushed down into the stomach through the opening. This, he adds, is the only method by which vomiting can be prevented, and the suspected substance exhibit its true character.‡ The testimony to be derived from this proof of poisoning, is, however, barely *presumptive*. The poisonous substance may be decomposed in the stomach of the patient by food or antidotes—it may have been rejected by vomiting, or it may have been absorbed, so as to leave a minute quantity in the intestinal canal; and, in all these cases, the animal will probably escape uninjured. "Experiments of this kind, separately considered, possess no value, only as they present a positive result, that is to say, death; but we repeat again, they ought not to be regarded, even when well made, except as a secondary means, proper for corroborating the conclusions drawn from chemical analysis, symptoms, and lesions of texture."*

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* Foderè, vol. 4, p. 199, 200, 201.

† Mahon, vol. 2, p. 301.

‡ Orfila, vol. 2, p. 532. It has been objected t this mode of experimenting, that the operation on the œsophagus will destroy ife, or produce alterations of texture; but our author shows by numerous exam es, that the ligature on this part in dogs constantly produces, during the two first ays nothing more than a slight

It must also be recollected, in connection with the circumstance under notice, that the human fluids, and particularly the *bile*, may, from disease, acquire such an acrimony as to be fatal to animals. Morgagni relates a remarkable instance of this kind. A child died of tertian fever, after having suffered violent convulsions. On dissection, the stomach was found to contain green bile, which tinged the scalpel of a violet colour. Having dipped the point of his instrument in the bile, he wounded two pigeons, who expired almost instantly in violent convulsions; and some of it, mixed with bread, was given to a cock, who also expired in a short time.†

Until now, I have considered the subject of poisoning persons in a state of health. I may add, that this is often attempted on individuals who are ill, and the difficulty of distinguishing the symptoms of disease from those of poison is proportionably increased. It may be said, that the disease has taken a sudden turn—that the medicines used have been prejudicial, and that present appearances are a convulsive or final effort of the system. In such cases, attention to the following circumstances is required:

1. The sudden occurrence of symptoms which do not usually accompany the disease under which the patient labours. Thus, we should feel suspicious, if, in an ordinary case, nausea, vomiting, hiccup, faintings, cold sweats, with bloody stools, should suddenly and rapidly follow each other; or again, if stertor, delirium, or insanity should supervene on a case of common disease.

2. Moral circumstances. The physician should never allow these to prejudice his mind, but he should never neglect noticing them. And I take this early occasion to say, that the physician is, of all persons, the best judge concerning them. Let him ascertain whether an enmity does not exist between the sick person and some one who attends or visits him; if so, enquire whether any poisonous substances have lately been purchased—whether these are still in the house—whether the alarming symptoms came on immediately after taking a drink, or any other substance of an innocent nature—and particularly, ascertain whether any thing has been given without the orders of the physician, or by a person ignorant of medicaments.

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fever, and a little dejection, which is incapable of destroying them in so short a time; and also, that if animals be killed when in this state, no lesions will be discovered on dissection. If poisons, on the contrary, be introduced through the opening, their effects will be early manifested. Vol. 2, p. 482.

* Orfila, vol. 2, p. 535.

† Morgagni, vol. 2, epist. 59, p. 396.

A case or two will illustrate the subject before us. An individual, aged fifty-six years, and subject to flatulence, took a bowl of chocolate and milk previous to starting on a journey. It was prepared by his daughter. He had advanced a very short distance, when he was seized with nausea, vomiting, and other severe symptoms, which obliged him to return home, and his death followed in nine hours after taking the chocolate. His body was not inflated—his visage was natural, but the nails were blue, and on his shoulders and breast were spots of the same colour. This disease was considered cholera morbus, but Hoffman, from whom the narrative is taken, believed it to be the effect of arsenic rather than cholera, and for the following reasons: the symptoms which followed the use of the drink, such as copious vomiting, accompanied with a cadaverous paleness of the face, coldness of the extremities, great prostration of strength, poignant lancinating pain in the intestines, and the cessation of arterial action, and convulsions, all succeeded each other with greater rapidity than is observed in ordinary cholera morbus. Again, the daughter was at enmity with the father, who had punished her for living with her valet, and it was also known that she had previously purchased arsenic.[*]

In another case, an individual in ill-health took some jelly, which his wife gave him to allay a cholic. He felt nausea in a short time—breathed with difficulty—experienced severe pain in the stomach—vomited with great exertion a greenish bile, and finally died at the end of two days. He was buried on the third day after his decease, but was disinterred in twenty-four hours thereafter, from a suspicion that he had been poisoned by his wife. Putrefaction had advanced rapidly—the body was much swollen—the jejunum, mesentery, liver and lungs, were in a state of sphacelus—the heart was filled with black blood, resembling ink, and the stomach was in a gangrenous state near the pylorus, and contained a greenish coloured matter. Under these circumstances, the question of poisoning was supposed to be settled, and the woman was considered guilty. Hoffman, however, thought otherwise, from the following facts: the man had been ill for more than a year—his appetite was bad, and his strength impaired. On the morning of the day when he took the jelly, he complained of severe cholic pains, and swallowed a large glass of brandy. After this, his wife had given him the jelly, and finding no benefit from it, he had again taken brandy, which also contained some heating substances. From this history, and also from knowing of no moral circumstances against his wife, Hoffman believed that the disease alone would account for all these symptoms.[†]

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[*] F. Hoffman's Opera Omnia, vol. 3, sect. 2, chap. 8, p. 170.

[†] Hoffman ut supra, p. 171. Both these cases are quoted by Foderè; and this author relates an instance within his own observation, where the exhibition of a dose of Epsom salts was ordered by the physician, and the husband gave it to his wife. It was followed by all the symptoms of narcotic poison, and death ensued in a short time. From his libidinous habits and the symptoms present, there was no question that he intended to poison her, and accordingly had substituted opium. Foderè, vol. 4, p. 212. The duty of the physician is certainly very clear in these cases.

These narratives will serve as illustrations of the comparison that should be made between the symptoms present, and those that ordinarily accompany the supposed disease. They are, however, greatly defective in other respects, inasmuch as dissection in the one instance, and chemical analysis in both, appear to have been omitted.

If difficulties and doubts envelope the discovery of poisons, whose distinguishing character is the rapidity of their effects, how much greater must be the uncertainty when we are required to ascertain the administration of what are called slow poisons. This subject, indeed, is so closely entwined with popular superstition, that it is difficult to separate truth from falsehood. In Italy, for example, it was formerly said, that poisons were invented to destroy life at any stated period—from a few hours to a year.* This, however, is a mere fiction, and it is now

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* We are indebted to Professor Beckmann for a very elaborate article on this subject, in which he has concentrated nearly all that is known concerning *secret poisoning*. Of this, I shall present an abstract, aided with some facts from other sources. He considers it unquestionable, that the ancients were acquainted with this kind of poison, and thinks it may be proved from the testimony of Plutarch, Quintilian, and other respectable authors. The former states that a slow poison, which occasioned heat, a cough, spitting of blood, a consumption, and a weakness of intellect, was administered to Aratus of Sicyon. Theophrastus speaks of a poison prepared from aconite, which could be moderated in such a manner as to have effect in two or three months, or at the end of a year, or two years; and he also relates, that Thrasyas had discovered a method of preparing from other plants a poison, which, given in small doses, occasioned an easy but certain death, without any pain, and which could be kept back for a long time without causing weakness or corruption. This last poison was much used at Rome, about two hundred years before the Christian æra. At a later period, a female named Locusta, was the agent in preparing these poisons, and she destroyed in this way, at the instigation of Nero, Britannicus, the son of Agrippina.

The Carthaginians seem also to have been acquainted with the art of poisoning; and they are said, on the authority of Aulus Gellius, to have administered some to Regulus, the Roman general. Cotemporary writers, however, it must be added, do not mention this.

The principal poisons known to the ancients were prepared from plants, and particularly aconite, hemlock, and poppy, or from animal substances, and among the latter, none is more remarkable than that obtained from the sea-hare, (*Lepus marinus* or *Aplysia depilans* of the Systema Naturæ.) With this, Titus is said to have been dispatched by Domitian. They do not seem to have been acquainted with the common mineral poisons.

In the year 1659, during the pontificate of Alexander VII. it was observed at Rome, that many young married women became widows, and that many husbands died when they became disagreeable to their wives. The government used great vigilance to detect the poisoners, and suspicion at length fell upon a society of young wives, whose president appeared to be an old woman, who pretended to foretell future events, and who had often predicted very exactly the death of many persons. By means of a crafty female, their practices were detected—the whole society were arrested and put to the torture, and the old woman, whose name was Spara, and four others, were publicly hanged. This Spara was a Sicilian, and is said to have acquired her knowledge from Tofania at Palermo.

Tophania, or Tofania, was an infamous woman, who resided first at Palermo, and afterwards at Naples. She sold the poison, which from her acquired the name *Aqua della Toffana*, (it was also called *Acquetta di Napoli*, or *Acquetta* alone,) but she distributed her preparation by way of charity to such wives as wished to have other husbands. From four to six drops were sufficient to destroy a man, and it was asserted, that the dose could be so proportioned as to operate in a certain well understood, that we know of no substances which will produce death at a determinate epoch. But I shall have occasion, in the next section, when stating the case of the late Prince Charles, of August-

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time. Labat says, that Tofania distributed her poison in small glass phials, with this inscription, *Manna of St. Nicholas of Bari*, and ornamented with the image of the saint. She lived to a great age, but was at last dragged from a monastery, in which she had taken refuge, and put to the torture, when she confessed her crimes, and was strangled.

In no country, however, has the art of poisoning excited more attention than it did in France about the year 1670. Margaret d'Aubray, wife of the Marquis De Brinvillier, was the principal agent in this horrible business. A needy adventurer, named Godin De Sainte Croix, had formed an acquaintance with the Marquis during their campaigns in the Netherlands—became in Paris a constant visitor at his house, where in a short time he found means to insinuate himself into the good graces of the Marchioness. It was not long before the Marquis died; not, however, until their joint fortune was nearly dissipated. Her conduct, in openly carrying on this amour, induced her father to have Sainte Croix arrested and sent to the Bastile. Here he got acquainted with an Italian, of the name of Exili, from whom he learnt the art of preparing poisons. After a year's imprisonment, Sainte Croix was released, when he flew to the Marchioness, and instructed her in the art, in order that she might employ it in bettering the circumstances of both. She assumed the appearance of a nun, distributed food to the poor, nursed the sick in the *Hôtel Dieu*, and tried the strength of her poisons undetected on these hapless wretches. She bribed one Chausée, Sainte Croix's servant, to poison her own father, after introducing him into his service, and also her brother, and endeavoured to poison her sister. A suspicion arose that they had been poisoned, and the bodies were opened, but no detection followed at this time. Their villainous practices were brought to light in the following manner: Sainte Croix, when preparing poison, was accustomed to wear a glass mask; but as this happened once to drop off by accident, he was suffocated, and found dead in his laboratory. Government caused the effects of this man, who had no family, to be examined, and a list of them to be made out. On searching them, there was found a small box, to which Sainte Croix had affixed a written request, that after his death it might be delivered to the Marchioness De Brinvillier, or in case she should not be living, that it might be burnt. This request was as follows: " I humbly beg that those into whose hands this box may fall, will do me the favour to deliver it into the hands only of the Marchioness De Brinvillier, who resides in the Street Neuve St. Paul, as every thing it contains concerns her, and belongs to her alone, and as besides, there is nothing in it that can be of use to any person except her; and in case she shall be dead before me, to burn it, and every thing it contains, without opening or altering any thing; and in order that no one may plead ignorance, I swear by the God whom I adore, and all that is most sacred, that I advance nothing but what is true. And if my intentions, just and reasonable as they are, be thwarted in this point, I charge their consciences with it, both in this world and the next, in order that I may unload mine, protesting that this is my last will. Done at Paris, this 25th May, in the afternoon, 1672. *De Sainte Croix.*" Nothing could be a greater inducement to have it opened, than this singular petition, and that being done, there was found in it a great abundance of poisons of every kind, with labels, on which their effects, proved by experiment on animals, were marked. The principal poison, however, was corrosive sublimate. When the Marchioness heard of the death of her lover and instructor, she was desirous to have the casket, and endeavoured to get possession of it by bribing the officers of justice; but as she failed in this, she quitted the kingdom. La Chausée, however, continued at Paris, laid claim to the property of Sainte Croix, was seized, and imprisoned, confessed more acts of villainy than was suspected, and was, in consequence, broken alive on the wheel, in 1673.

The Marchioness fled to England, and from thence to Liege, where she took refuge in a convent. Desgrais, an officer of justice, was despatched in pursuit of her, and having assumed the dress of an abbé, contrived to entice her from this prienberg, to show that the idea of slow poison is still prevalent, even among the physicians of continental Europe.

There is, however, a certain class of poisons, which are slower in their operations, and may hence more readily be confounded with the effects of disease. And these belong to the astringent kind. It is

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vileged place. Among her effects at the convent, there was found a confession, and a complete catalogue of all her crimes, in her own hand-writing. She was taken to Paris, convicted, and on the 16th of July, 1676, publicly beheaded, and afterwards burnt.

The practice of poisoning was not, however, suppressed by this execution, and it was asserted, that confessions of a suspicious nature were constantly made to the priests. A court for watching, searching after, and punishing poisoners, was at length established in 1679, under the title of *Chambre de Poison,* or *Chambre ardente.* This was shortly used as a state engine, against those who were obnoxious to the court, and the names of individuals of the first rank, both male and female, were prejudiced. Two females, La Vigoreux and La Voisin, were burnt alive by order of this court, in Feb. 1680. But it was abolished in the same year.

Professor Beckmann relates the following, as communicated to him by Linnæus; "Charles XI. King of Sweden, having ruined several noble families by seizing on their property, and having, after that, made a journey to Torneo, he fell into a consumptive disorder, which no medicine could cure. One day he asked his physician, in a very earnest manner, what was the cause of his illness.—The physician replied, "Your majesty has been loaded with too many maledictions."—"Yes," returned the king, "I wish to God that the reduction of the nobility's estates had not taken place, and that I had never undertaken a journey to Torneo." After his death, his intestines were found to be full of small ulcers."

There has been great diversity of opinion as to the nature of these poisons. That prepared by Tofania appears to have been a clear insipid water, and the sale of aquafortis was for a long time forbidden in Rome, because it was considered the principal ingredient. This, however, is not probable. In Paris, the famous *poudre de succession,* (also a secret poison) was at one time supposed to consist of diamond dust, pounded exceedingly fine; and at another to contain sugar of lead, as the chief ingredient. Haller was of this last opinion. In the casket of Sainte Croix were found sublimate, opium, regulus of antimony, vitriol, and a large quantity of poison, ready prepared, the principal ingredients of which the physicians were not able to distinguish. Garelli, physician to Charles VI. king of the two Sicilies, at the time when Tofania was arrested, wrote to the celebrated Hoffman, that the *Aqua Tofania* was nothing else than crystallized arsenic, dissolved in a large quantity of water by decoction, with the addition, (but for what purpose he knew not) of the herb *cymbalaria,* (probably the *Antirrhinum cymbalaria.)* And this information, he observes, was communicated to him by his imperial majesty himself, to whom the judicial procedure, confirmed by the confession of the criminal, was transmitted. But it was objected to this opinion, that it differed from the ordinary effects of arsenic, in never betraying itself by any particular action on the human body.

The Abbé Gagliani, on the other hand, asserts that it is a mixture of opium and cantharides, and that the liquor obtained from its composition, is as limpid as rock-water, and without taste. Its effects are slow, and almost imperceptible. Beckmann appears to favour this idea, and suggests that a similar poison is used in the east, under the name of *poust,* being water which had stood a night over the juice of poppies. It is given to princes, whom it is wished to despatch privately, and produces loss of strength and understanding, so that they die; in the end, torpid and insensible.—(Beckmann, vol. 1, p. 74 to 103. Smith, p. 195. London Monthly Mag. vol. 14, p. 515. Metzger, p. 386, 402.)

The following extract will show that *secret poisoning* has penetrated into the forests of our own country. "The celebrated chief, *Black Bird,* of the Omawhaws, gained great reputation as a medicine man; his adversaries fell rapidly before his potent spells. His medicine was arsenic, furnished him for this purpose by the villainy of the traders."—Major Long's Expedition, vol. 1, p. 226.

also possible that minute portions of the acrid poisons administered from time to time, may gradually cause irreparable injury to the digestive and lymphatic system, and finally destroy life. In such cases, the physician should not mistake a disease, or the effects of a bad constitution, for the consequences of the exhibition of noxious substances. The symptoms of the individual should be noticed for a length of time —and the state of his health previous to the last illness should be well understood. It is also important to ascertain whether some impropriety in food or medicine has not led to the present result, and a comparison may be made with the known effects of slow poison—first a depraved, and then a destroyed appetite—weakness, marasmus, depression of spirits, a slow fever, chills, and heat, &c. Lastly, dissection should exhibit appearances distinctly referable to the supposed noxious cause.*

Poisons may also be administered to several persons at once, as at an entertainment, and the symptoms that follow be so various as to render the cause doubtful, were it not understood that such consequences are of frequent occurrence. I shall endeavour to illustrate this point by some cases.

In the month of May, 1711, four individuals, viz. a priest, two females, one of whom was his sister-in-law, and another person, all in good health, and on a journey, stopped at an inn to dine. They proceeded on their journey after taking this meal, but in a short time the priest was seized with such violent pain, as to oblige him to dismount from his horse. Copious evacuations by vomiting and stool succeeded, and his illness increased so rapidly, that it was found necessary to take him back to Cesenne, the place where they had dined. A physician was called in, who conceived the complaint to be only an ordinary cholic, treated it with fomentations, glysters, purgatives, and anodynes. During this time, one of the females was seized with severe pain and weakness, accompanied with copious evacuations. The fourth person of the party also complained of pain and weight of the stomach; but notwithstanding this, the physician had no suspicion of poison, since the other female was in perfect health, and the landlord protested that there could have been nothing noxious in his dishes. On the next day, they were all somewhat better, and were enabled to arrive at a place near where Morgagni resided, for whom they immediately sent. This great physician having learnt the circumstances, immediately enquired whether there was not some dish on the table, of which the female in good health had not eaten. He was answered in the affirmative, and it was ascertained to have been a large dish of rice, served up at first. He settled in his own mind, that there were poisonous materials in this dish; but the difficulty was, why the priest who had eaten the least, should have suffered the most, while the female who had eaten a larger quantity was not so ill; and finally, that the fourth person, who had eaten more than all the rest, had only some pain in his stomach. Was there not, said Morgagni, some cheese grated over this rice? They answered in the affirmative, and the priest, who had little or no appetite, ate scarcely any thing but the cheese; the female ate both cheese and rice, while the other person ate the rice with scarcely any cheese. Then, said Morgagni, the state of the case is, that the cheese was prepared with arsenic to kill rats, and not having been laid away with sufficient care, it was served up for your rice, while you were hurrying the landlord for your dinner. This opinion was verified by the confession of the landlord himself, who learning that the patients were out of danger, avowed that such was the cause of the accident.

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* Foderè, vol. 4, p. 226. Mahon, vol. 2, p. 316. Orfila, vol. 2, p. 552. The latter relates some cases of slow poisoning, which I shall hereafter notice when considering individual poisons.

At a banquet, numerously attended, a dish was brought in during the dessert, in which arsenic had been used instead of meal. Those of the guests who had eaten or drank but little, died in a few hours, whilst those who had eaten considerably, were saved by copious vomiting. Some lived for several years, and when examined after death, *the cicatrices of large ulcers were found in their stomachs.*

In another instance, a boy two years old, and two adult females, partook of some soup in which arsenic was mixed. The boy took only two spoonfuls, but it was on an empty stomach; whilst the females, who had already eaten, took the remainder of it. They vomited copiously, and survived; whilst the other did not vomit, and died, and on dissection, his stomach was found ulcerated.*

From these, and several other cases related by Morgagni and Hoffman, Foderè draws the following conclusions. 1. In such instances, the physician should enter into the most minute details concerning every thing that has passed at the meal. Enquire whether every one eat from all the dishes, and in what quantity—what kind of meats were sat down, and what wines drunk. 2. That very different effects ensue from taking poison on an empty or on a full stomach; and hence Baccius, he says, recommends to those *who fear being poisoned at a banquet, first to eat and drink a considerable quantity.* This precaution was doubtless not an idle one in some of the capital cities of continental Europe, and one effect of it certainly is, that it protects the stomach to a certain degree from the activity of the poison, and also facilitates vomiting. The practice of mountebanks, who pretend to sell antidotes to arsenic, is said to be in conformity with this direction. They first fill the stomach with milk or oily fluids, and then swallow the arsenic in public. In secret, however, they shortly throw it up again, and sometimes it proves fatal when retained too long. 3. It may sometimes be necessary to enquire of what kind of dainties the poisoned persons were most fond, since murderers have sometimes taken advantage of a known partiality. 4. It is evidently no reason that a certain article of food or drink is not poisonous, because some individuals have taken it without inconvenience. We have already seen the difference between vomiting and not vomiting. The greater the quantity of poison taken, the more is there a hope of escaping; whilst those who feel no immediate ill-effects, are often the earliest victims. Both descriptions of persons should be examined, and the matter vomited should be analyzed, in order to detect the nature of poison.*

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* Foderè, vol. 4, p. 242, 244. These cases are quoted from Morgagni—*de Causis et Sedibus Morborum*, epist. 59.

It is a very difficult question to determine whether poisoning is the result of suicide or homicide. We can only form an opinion from moral considerations, and a notice of the following is recommended by Foderè. The previous state of mind of the deceased—whether he has been subject to delirium; also, if he has not met with losses—has been disappointed in his hopes, or is suffering under disgrace. Also, whether any of the persons with whom he lived or associated, had any interest in his death. The season of the year also deserves consideration. He observes, that suicides are most frequent during the period of the solstices and the equinoxes. We should also ascertain whether the patient, instead of complaining, remains quiet, seeks solitude, and refuses the aid of medical men and of medicines. Any kind of writing left by the individual, to express his last wishes, as it is the most common, so it is also the most certain proof of self-destruction. But the finding a part of the poison in the room or in his pockets, is evidently a very equivocal proof, since it may quite as easily be put there by others as by himself.†

It may sometimes happen that a false accusation of poisoning is brought, and that great illness is pretended. In such instances, the complainer should be tested by the rules already laid down, and a long examination will scarcely ever be necessary in order to develope the deceit.

I shall conclude this section with a notice of the diseases and symptoms that are most likely to be mistaken for the effect of poisons; and they probably are idiosyncracy, indigestion, and sudden illness.

Idiosyncracy is an inexplicable circumstance in the animal economy, but however extraordinary it may appear at first sight, yet it is no less true that individuals will have an antipathy to some particular article of diet; and in some instances the bare seeing of it, and in others the eating of it, produces the most alarming consequences. Cheese, and various other articles, have produced such effects. But the most striking cases of resemblance to the effects of poison, probably occur in those who, after being long accustomed to a particular species of food, for the first time use another kind. The town of Martigues in

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* Foderè, vol. 4, p. 240 to 248. Orfila, vol. 2, p. 548.

† Foderè, vol. 4, p. 248. Smith, p. 274. Metzger observes, "La seule présomption physique, (of suicide) est la quantité considerable du poison englouti, dont le gout nause abond eüt certainement excite le vomissement, s'il eût été administré par une main étrangère. Les poisons vegetaux entrainent presque toujours l'idée d'imprudence, et excluent consequemment, dans le plus grand nombre des cas, celle de suicide; l'opium seul est communement mis avec connoissance de cause en usage." P. 148.

France, is almost altogether inhabited by fishermen, who have lived on fish since their infancy. Foderè, during the first year of his residence there, often prescribed meat soups to his sick, but, in every instance, their administration was followed by violent nausea and vomiting. They confessed that it was the first time they had used any aliment prepared from meat.

Next as to indigestion. Extraordinary instances will often occur, in which symptoms the most violent and uncommon, suddenly exhibit themselves. This is particularly the case with those who live in a luxurious manner, eat mushrooms and truffles, or shell-fish, in peculiar seasons of the year. A violent pain comes on, the stomach is attacked with spasmodic constriction, green matter is vomited, and we would certainly believe a poison had been maliciously administered, did we not know how vitiated the bile may become, and what powerful efforts are necessary in a weak stomach to throw off indigestible food. It is proper to recollect that such symptoms may occur even in the midst of a repast, and caution is hence required, so as not to confound the cause with the effects of poison.

On the subject of sudden illness and death, more will be said in the next section. At present, the following circumstances may be recommended, as worthy of attention. 1. The season of the year and the prevailing epidemic. Thus cholera morbus rages in the summer and autumn, and as cholic and vomiting may then be said to be epidemic, we would not of course be so much surprised at their sudden appearance, as if they came on in winter. 2. The former habits of the patient; his mode of life and state of health should be ascertained; and we should learn, if possible, whether he has no concealed disease. Sudden death is sooner to be expected in a valetudinarian, than in one who has previously enjoyed perfect health. 3. We should notice whether fever be present or not. It is an uncommon circumstance, that internal disease of a fatal kind, and of the nature we are now noticing, is present without more or less fever. Poisons, however, during their first operation, are not accompanied with it.*

2. *Signs of poison on the dead body.*

In many instances, the medical examiner is not called until the stage now about to be considered. The illness may have been sudden and rapid; it may have been difficult to procure medical aid, and thus the opportunity has been lost of comparing the symptoms with the appearances found on dissection. If such be the case, he should be guided solely by the phœnomena that present themselves during the inspection.

In addition to the rules already laid down in a former chapter, concerning medico-legal dissection, it is proper to observe, that the mouth, larynx, and trachea should be examined—and after opening the abdomen, the liver should be raised, so as to view its concave surface, the gall-bladder and a portion of the stomach. The spleen, pancreas, intestinal canal and mesentery, should be all noticed. Ligatures are then to be applied to the œsophagus and rectum, and the parts included with them removed from the body. This precaution is absolutely necessary, to prevent the loss of any fluids contained in the alimentary canal.

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* Foderè, vol. 4, p. 289 to 297.

After being thus removed, it should be opened throughout its whole extent, and the fluids and solids contained in it should be collected in proper vessels. The whole internal surface must then be washed with distilled water, which must likewise be preserved. The lesions observed should be noted, and all the inflamed or gangrenous portions detached with a scalpel. If there be any perforations, the parts round the holes should be taken out, and the solid portions preserved in alkohol. And it is highly important, in this case, previously to absorb with a sponge all the fluid contained in the abdomen, and afterwards to deposit it in proper receptacles for future analysis.*

This examination should be made in the presence of a magistrate, and every fact should be recorded by a secretary in the order of its notice.

The next subject of inquiry is, the class of poisons which the appearances on dissection seem to indicate.

The corrosive or acrid poisons generally produce inflammation of the first passages, constrictions of the intestinal canal, gangrene, sphacelus, and perforations of the parts. The inflammation however varies as to extent and intensity. Sometimes it affects the mouth, œsophagus, and more particularly the stomach, and extends to the duodenum, while in others it reaches through the whole space of the digestive tube. Again, the membranes are sometimes of a clear red colour, without any trace of ulceration; sometimes of a cherry red, with longitudinal or transverse patches of a blackish colour, formed by extravasated blood between the coats. Ulcerations are observed in various parts, but particularly near the pylorus.

Another character of these classes of poisons is, the separation of the mucous or villous coat of the stomach from the muscular, in such a manner that it and the serous remain perfectly isolated. Hebenstreit mentions this as a striking proof, and his opinion is adopted and advocated by Mahon and others.† The latter remarks, that such a separation cannot take place, without some corrosive substance has been applied to the internal surface of the stomach, for it is impossible to believe that putrefaction could produce such an effect, and the folds and rugosities of the internal coat would not permit this sudden separation except from some powerful cause.‡ He therefore insists on it, as a most positive proof, and his opinion has met with the acquiescence of Foderè and Orfila.

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* Orfila, vol. 1, p. 72. vol. 2, p. 519.

† "Corrosiva venena—illum rodunt, dissecant, vulnerant, et primario quidem illam ejus internam tunicam, quæ villosa dicitur, destruunt, atque ab substrata altera, *vasculari* seu *nervea* dicta, avellunt," &c.—Hebenstreit, p. 498.

‡ Mahon, vol. 2, p. 289. He suggests that similar appearances may *possibly* be observed on the crisis of certain atrabiliary diseases; but, in this instance, the previous symptoms of the patient, with the correspondent lesions found on dissection, will readily distinguish the cause.

Again, the action of these poisons is sometimes extended to the other viscera, and the skin becomes covered with black spots, resembling gangrene. Morgagni mentions the case of a woman poisoned with arsenic, and who had experienced very little pain from it, whose body, notwithstanding, was entirely black after death, on its posterior surface from head to foot, while the lungs were gangrenous, and the stomach and duodenum perforated.[*] In general, the lungs are of a deeper red than in the natural state, and it is not uncommon to find in them a bloody serosity.

These are the ordinary effects of corrosive or acrid poisons.[†] The variations occasionally observed, we shall hereafter notice, but it is proper to add in this place a remark from Baillou. He states, that in cases of sudden death, poison is often deemed the cause, if on dissection the left side of the lower part of the stomach contains dark-coloured spots. But this should not be attributed to external causes, since it is caused by the blood itself which settles in the branches of the vasa brevia at death. On the other hand, however, the slightest and smallest holes or erosions in the stomach should be carefully examined; and this will be best effected by holding the viscus between the eye and the light, as, by doing so, many apertures in its substance have been found, which otherwise would elude observation.[‡]

The effects of narcotic poisons are generally stated to be the following: a rapid tendency to putrefaction, evidenced by large spots on the skin, of a red or livid colour; a red, swollen, or livid countenance; flexible extremities; the blood in a fluid state, and effused in various parts, and the stomach and intestines touched with sphacelus, without any inflammation.[§] Orfila contradicts the correctness of several of these. He has frequently observed, that putrefaction was not advanced more than usual at twenty-four, or even thirty-six hours after death; that the limbs were as stiff as in those who had been poisoned by substances of another class, and that the blood was coagulated a short time after death. On dissection, no traces of inflammation were found by him in the digestive canal of animals killed by narcotics, and he attributes such appearances to the subsequent administration of substances capable of producing inflammation. The lungs, however, present almost constantly livid and even black spots, and their texture is more dense and less crepitating. The brain also often exhibits distention of its veins.[||]

As to the narcotico-acrid, it may be remarked, that there are some which are capable of exciting a severe inflammation, accompanied with ulceration or gangrene, while others do not inflame. The lungs, blood, brain, and other organs, present, in general, the same alterations as are induced by the narcotics.

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[*] Morgagni, vol. 2, epist. 59, p. 367.

[†] Foderè, vol. 4, p. 262. Orfila, vol. 1, p. 15, vol. 2, p. 98, 520. The last author has conclusively proved, that corrosive and acrid poisons produce lesions of texture precisely alike.

[‡] Foderè, vol. 4, p. 269. [§] Ibid. p. 258. [||] Orfila, vol. 2, p. 171, 522.

The astringent poisons, of which lead is the primary one, when taken in the form of salts, produce inflammation of greater or less vehemence, and sometimes black points or spots are seen, caused by the extravasation of venous blood. Saturnine emanations, on the contrary, produce no inflammation; but the intestinal canal, and particularly the colon, is contracted in its diameter.

The reader must not, however, suppose, that the lesions now described, are the invariable results of the respective kinds of poison. On the contrary, a great variety in this respect has been noticed. Thus Marc, in a case of poisoning by arsenic, found the membranes of the stomach *thickened* instead of *eroded*.* And what is still more extraordinary, there have been cases where the exhibition of acrid and corrosive poisons have left no marks of disease in the stomach or intestinal canal. Morgagni, Wepfer, and Brunner, mention instances of this nature, and Sauvages speaks of a person who died suddenly after a violent epileptic fit, from swallowing fifteen berries of the sumach. Ten were ejected by vomiting, and the remaining five were found in the stomach after death. Notwithstanding this, the stomach exhibited no marks of lesiôn, nor was any other part of the body diseased. Etmuller mentions the following remarkable occurrenee. A young girl having taken arsenic, vomited considerably during the night, and on the next morning was found dead. The skin was of a livid blue colour, but no appearances of disease could be found on dissection. There was no inflammation or gangrene present, yet in the stomach a white powder was observed, which, on being thrown on the coals, gave out a thick smoke with an arsenical odour. Powders containing a similar substance were found in the house, part of which was given to a dog, with fatal effects, and on dissection the stomach was found extensively inflamed. It is conjectured by the reporter, that the poison having been taken on a full stomach, may have prevented its usual chemical action.†

It has been supposed, in explanation of these anomalies, that such poisons as are given in the form of powder, will more readily cause destructive effects on the stomach, than those which are soluble. We are, however, not in possession of sufficient facts to explain satisfactorily the great variety that is occasionally observed; and experiments, so far as they have proceeded, do not permit us to assign that as the general cause.‡

Having examined the stomach and intestines, and noted their appearance, the next circumstance that requires attention, is the collecting of the poison (if there be any) from those organs. And it is in this direction that modern medical jurisprudence so much exceeds ancient forms. Nothing ean be stronger proof, nothing will convict the criminal in a more satisfactory manner, than the discovery of the poison in the body of the deceased, and the subsequent detection of it by chemical tests.

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* Marc, p. 66. † Foderè, vol. 4, p. 272, 273. ‡ Orfila, vol. 2, p. 521.

In a number, possibly in a majority of cases, this search will be unsuccessful, and the cause of this has been already intimated. Murder is attempted by administering large doses of poison, and in some individuals, these produce copious vomitings, which indeed is often assisted by the deceased drinking copiously. Hence the chance of finding the poison is diminished, as it may have been rejected. But all the solid or fluid substances that are found, should be collected with care, preserved in proper vessels, and transmitted to a competent chemist, for deliberate examination. The distilled water with which the internal surface of the stomach is washed, also requires investigation.*

While chemistry can thus aid in detecting mineral poisons, it is of comparatively little value in discerning the nature of vegetable substances. The form, colour, and smell of the supposed poison, should, however, be noticed, and it is possible that traces of it may remain in the stomach, but slightly altered from their natural state. By a comparison with the previous symptoms, and by submitting these to the inspection of a skilful botanist, we may possibly arrive at the truth. In all cases, the medical jurist should recollect, that he has but half performed his duty, if he does not call to his assistance all that knowledge which attention to particular sciences can afford. If he does not avail himself of it, he may rest assured that the criminal will escape, to the discomfiture of the ends of justice, and the disgrace of the profession.

Having already mentioned the animal to which it will be proper to administer a portion of the noxious substance, it is only necessary to add, that soon after its death, the stomach should be examined, and a statement taken of the lesions that are observed.

All the dissections of which we have spoken, will be most satisfactory and conclusive, if the examination be made in as short a time as possible after death, since putrefaction generally commences in the viscera of the abdomen—the very organs that require the most critical examination. It is difficult, in cases of incipient or actual gangrene, to distinguish the spots or blotches produced by it, from those that are caused during life. Mahon, however, suggests the following distinction, which is evidently founded in truth. "If the stomach preserves its natural colour, and the spots on it are marked with red, while the borders of ulcers are also of a vivid or pale red colour, we are sure that the cause has operated during life; but if the stomach and its spots are livid and pale, we should attribute the appearance to putrefaction, and attach no value to it."†

Notwithstanding these difficulties, it is a common occurrence, that the bodies of persons supposed to be poisoned, are dug up several days after death, for examination. In such cases, before investigating the particular instance, the season of the year, its dryness or humidity, the winds, and indeed every thing that can be more or less favourable to the preservation of dead bodies, should be considered. It is certainly established beyond a doubt, that a body buried for a length of time will be more free from putrefaction than another that has been kept unburied for the same space. It may also happen, that the poison given has been of a drying nature, and of a kind that seems to delay decomposition. Corrosive sublimate is said to do this, and if we notice any thing of such a nature, it should be mentioned in the report. As a general rule, the examination of bodies in this situation should not be totally neglected. The medical jurist has only a more difficult task to perform. He must state the circumstances that are present—mention the progress of putrefaction, and clearly explain in what respects it prevents the examination from being satisfactory or conclusive.

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* It is not necessary in this place to advert to the various tests, as these will be particularly mentioned under the head of mineral poisons, and I shall conclude the notice of that class by a classification of the results to be deduced from them.

† Mahon, vol. 2, p. 315.

Nor must it be forgotten, that the use of some innocent substances during life, may cause appearances of a suspicious nature, and which therefore strongly illustrate the necessity of understanding the previous history of the patient. The following case, from Foderè, will tend to illustrate this remark. A person at Chalons sur Marne, was just recovering from a severe sickness, and during his convalescence, took a gentle laxative, after the operation of which he suddenly died. He was supposed to have been poisoned through the negligence of the apothecary, and to ascertain this, the body was opened. The stomach and œsophagus were found red, and in some places livid, and resembling gangrene. Here the investigation stopped, and the patient was looked upon as evidently poisoned. M. Varnier, a physician at Chalons, knowing the exactness and prudence of the apothecary, felt, however, strong doubts concerning the cause of death, and on reflection, determined that the convalescence had been only an insidious respite. But it was necessary to assign a reason for the colour of the œsophagus and stomach; and having learnt that the deceased had been in the habitual use of a strong infusion of red poppies (*coquelicots*) for some time, the idea struck him that this might be the cause. To ascertain the fact, he gave a similar infusion to a dog for some time, and on dissection, found that the organs above mentioned were precisely of the same colour as on the body of the person supposed to be poisoned. So deep indeed was it, that it resisted repeated ablutions.*

This case teaches us a useful lesson in legal medicine, viz. that the fluids and solids may be coloured by various alimentary substances or medicaments, if their use be long persisted in; and it also gives a caution, not to depend too much on a single phænomenon, but to view all the known facts in connection, and then deduce a judgment from them.

In the general remarks on poisons, it was mentioned that they might be introduced into the system by means of injection, and I repeat it at this time, for the purpose of enforcing the direction of examining the whole intestinal canal from the mouth to the rectum. If this noxious substance be thrown up in the above manner, it will of course be in vain to look for its indications in the stomach or smaller intestines.

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* Foderé, vol. 4, p. 282.

The wife of a receiver-general of taxes in the department of Arriege, was attacked some years since (in 1807) with a slight illness, which rapidly terminated in a severe and fatal one. On dissection, the intestines were found in a state of high inflammation. A servant girl was arrested on suspicion, and it appeared that she had mixed twenty-four grains of tartar emetic in the tisan or drink of her mistress, and afterwards had boiled an ounce of arsenic with the liquid prepared for an injection. Previous to her execution, she confessed, that not finding the tartar emetic sufficiently active, she administered the arsenic.*

But there is a more difficult case, somewhat connected with this point, which deserves the most deliberate investigation. It is the atrocious villainy of introducing a poisonous substance after death, with a view of accusing an innocent person of the crime. Such an act is said to have been committed in Sweden, and it will readily occur, that if a corrosive substance be injected *per ano,* it may leave an inflammation sufficiently marked to lead the uninformed observer to the supposition that murder has been perpetrated.

So important a subject has not escaped the investigation of Orfila. He instituted experiments with corrosive substances on the dead bodies of men and dogs, and the result has established certain definite and fixed characters.† Several dogs were hung, and a short time after death a quantity of corrosive sublimate, in the form of powder, and in small fragments, was introduced into the rectum. On examination, the mucous coat of the intestine near the anus, exhibited several folds of a clear rose colour; but immediately above them, the rectum was of its natural colour, so that there was *a line of demarcation perfectly established between the parts to which the sublimate had been applied, and those which had not been in contact with it.* The same experiment performed on a living dog, presented, on dissection, an intense redness, which extended eight inches, *gradually* diminishing in intensity, and left no distinct line of demarcation. Similar effects were produced with arsenic. Verdigris, however, left no trace of demarcation or ulceration on the rectum of the dead dog, while it corroded the living parts. The sulphuric and nitric acids produced no other effect than their chemical one, and the lesions that indicate reaction in the system, such as inflammation and redness, were absent. Dr. Tartra found that he could produce on the dead, as well as on the living, that yellow or orange colour, which is the characteristic of nitric acid. The stomach was rendered rotten by it, but in all his experiments on the dead, the striking distinction was wanting, viz the presence of more or less inflammation. It could only commence on the living body. Lastly, Orfila ascertained, that when these poisons were introduced into the alimentary canal, twenty-four hours after death, they no longer excited redness or inflammation, because life is entirely destroyed in the capillary vessels. It is only when they are applied an hour or two after death, that the inflammatory phænomena, accompanied *with the line of demarcation,* are capable of occurring.*

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* Foderè, vol. 4, p. 266.

† He did not deem it necessary to experiment with the narcotics or narcotico-acrid, as the former do not produce any local lesion after death, and the latter only cause a slight degree of it.

As to slow poisons, in the sense already applied to that name, we may remark, that their peculiarities are very difficult to be distinguished. Foderè enumerates a long list of appearances, such as obstruction of the lymphatics, emptiness of the blood-vessels, a contraction and shrivelling of the viscera and marasmus;† but later and more minute observers contradict these.‡

Prince Charles of Augustenburg, Crown-Prince of Sweden, and the predecessor of Bernadotte in that station, fell dead from his horse on the 22d of May, 1810, while reviewing troops in Scania. His death, during that stormy period of public affairs, excited great attention, and an opinion soon spread abroad that he had been poisoned. The king ordered a judicial investigation, and it appeared that Dr. Rossi, the physician of the late prince, had, without any directions, proceeded to inspect the body twenty-four hours after death; that he had performed this operation with great negligence, omitting many things which the law prescribed, which the assisting physicians proposed, and which were essential to render it satisfactory; and finally, that the coats of the stomach, instead of being preserved and submitted to chemical analysis, were, according to his own acknowledgment, thrown away. The royal tribunal adjudged him to be deprived of his appointment, and to be banished from the kingdom. This decision would not of course diminish the suspicion already excited; and among other physicians who were consulted on the case, M. Lodin, professor of medicine at Lynkoping, presented two memoirs, in which he stated it as his opinion, that a *slow poison* of a vegetable nature, and probably analogous to the *aqua tofana,* had been administered to the prince, and that this had caused the apoplectic fit. His reasons were—1. That the prince had always enjoyed good health previous to his arrival in Sweden, and, indeed, had not been ill, until after eating a cold pie at an inn in Illaby. He was shortly after seized with violent vomiting, while the rest of the company experienced no ill effects. 2. The prince was naturally very temperate. 3. Ever since his arrival in Sweden, he had experienced a loss of appetite, with cholic and diarrhœa; and 4. That on dissection, the spleen was found of a black colour, and in a state of decomposition, and the liver indurated and dark-coloured; whilst, during life, he had experienced no symptoms corresponding to these appearances. Dr. Lodin confessed, however, that he was unacquainted with the effects that indicate the administration of such a slow poison, but thought that the previous symptoms were such as might be expected from it.

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* Orfila, vol. 2, p. 535 to 517. Foderè, vol. 4, p. 285.

† Foderè, vol. 4, p. 268. ‡ Orfila, vol. 1, p. 477.

For the credit of the profession, this conjectural opinion met with decided reprobation from other medical men. It appeared that the prince had, for several days previous, been subject to giddiness and pain in the head, and that all the symptoms were readily referable to a simple case of apoplexy, while the appearances on dissection showed that rapid tendency to putrefaction, which is frequently observed in similar cases.[*]

In the conclusion of the last section, several diseases were mentioned, that might be mistaken for the effects of poison. I shall now indicate certain circumstances which may lead to error, when examining the dead body—And they are cases of sudden death and peculiar phenomena observed on dissection.

It is not necessary to enlarge on the affections which in numerous cases destroy an individual suddenly. Dissection generally developes the rupture of some large vessel, the effusion of blood on the brain, or some similar disease, as the immediate cause, and these instances cannot be mistaken by a skilful anatomist, although the vulgar may be suspicious. So also when death follows, as is sometimes the case, from the indulgence of passion. Here the viscera are generally in a natural state, and of course as all lesion is absent, it will be impossible to infer that a noxious substance has been taken.

But there are diseases whose course and termination resemble in some degree the effects of poisons, and the symptoms that accompany them, with the traces that they leave, may often lead into error. The complaints that present the most striking appearances of this kind, are probably a repelled eruption, gout when it has left the extremities and attacked the stomach, acidity of the bile, malignant fevers and worms.[†] Many of these are accompanied with severe pain and violent vomiting, which commences so suddenly, as almost to bear the semblance of a disease from poison. Cholera morbus is another, which, during life, is marked by violent symptoms, and, on dissection, presents marks of inflammation or gangrene. The history of the case, however, the season of the year, the peculiar and appropriate symptoms and appearances on dissection, all must be critically scrutinized, in order to arrive at a just conclusion.[‡]

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[*] Foderè, vol. 3, p. 20; vol. 4, p. 236. Edin. Ann. Register, vol. 3, p. 345.

[†] Mahon, vol. 2, p. 312.

[‡] In cholera morbus, for example, the bilious vomitings and stools, with their attendant symptoms, will serve to characterize it; while, on dissection, although the stomach and liver are sometimes found inflamed, yet Orfila remarks, *that the inflammation or gangrene never extends throughout the whole of the digestive canal.* (Orfila, vol. 2, p. 495.) This observation appears to me strongly verified in a paper that has lately appeared in the Edin. Med. and Surg. Jour. vol. 19, p. 8 and 9. The author, Dr. Ranken, in treating of the epidemic cholera of the East Indies, runs a parallel between the symptoms and appearances on dissection, observed in this dreadfully rapid and fatal disease, and those resulting from poisons. The similarity is certainly great in many particulars, yet the one just adverted to does not appear to have been witnessed in any examination, although the disease is infinitely more violent than it appears in our own climate.

As to the peculiar phœnomena observed on dissection, the following cases may first be stated. In an instance were the stomach was found covered with exanthemata, the physicians would have pronounced judgment concerning the cause of death, had they not been informed that this eruption originated from the person having had the measles, and which, on account of the weakness of the patient, were only commencing to be thrown out of the skin, when he died.* Belloc gives us the following instructive case. An individual of the age of seventy although otherwise in apparent good health, was subject to repeated attacks of gout. One evening, about nine o'clock, he visited a particular friend, and at his house took some food, and at twelve returned home in high spirits. He went to bed, and at two in the morning rang for his servant, who found him speechless and apoplectic. Medical aid was called, but before it arrived he was dead. On dissection no alteration from the natural state was observed in the body, except that about eight inches of the ileon was livid, and apparently approaching to gangrene. It had been formerly noticed, that the deceased complained of pain in that part. And as the stomach and other intestines were in a healthy state, it was determined that no noxious substance could have caused this termination, but that it was owing to a translation of the gouty matter.† But the difficulty might have been greatly increased, as Foderè remarks, if instead of a metastasis to the ileon, there had been one to the stomach. These instances, then, prove the great importance of knowing the previous habits of the patient, his maladies, and their effects on his system.

But there are intrinsic difficulties connected with the appearance of the stomach, which have rendered it a subject of great doubt, and almost forced medical jurists to avoid drawing any inferences from it. I shall endeavour to state these as succinctly as possible.

1. *The vascularity of the human stomach after death* may lead to error unless properly observed. I have already mentioned a remark of Baillou on this point, and we are further indebted to Dr. Yelloly for some instructive observations on it. This distinguished physician examined the stomachs of twenty individuals, among which number were five criminals, who were hanged, and in whom therefore the appearances of health were likely to be found. Not one of the whole number had any affection of the stomach while living. In all he observed a highly vascular state of the villous coat of the stomach, in particular parts, (as about the pylorus and cardia,) with but two exceptions; in one of these, no vascularity was observed, and in the other it was obscure. In the five executed criminals, the vascularity amounted to a red or crimson hue. These appearances were distinct for a short time only after death, being most marked on the first day, and soon after, but at irregular periods, becoming more obscure. Dr. Yelloly infers, from these dissections, "that in the villous coat of the stomach, appearances of vascular fulness, whether florid or dark-coloured, in distinct vessels, or in extravasations of different sizes, are

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* Morgagni, vol. 2, epist. 69, p 398. † Belloc, p. 149.

not to be regarded as unequivocal marks of disease. They occur in every variety of degree and character, under every circumstance of previous indisposition, and in situations where the most healthy aspect of an organ might be fairly inferred. They are found in every part of the stomach, but principally in the posterior part of the great end, and in the lesser curvature, and they cover spaces of various extent, but are generally well defined and terminate abruptly." He also supposes that this vascularity is confined to the adult stomach, and is but seldom seen in young subjects.*

If we compare this statement with the appearances mentioned by Dr. Baillie, we shall readily see the danger of falling into mistakes on this point. Ordinary inflammation he characterises thus. "The stomach, upon the outside at the inflamed part, shows a greater number of smaller vessels than usual, but frequently not much crowded. In opening into the stomach, it is found to be a little thicker at the inflamed part, the inner membrane is very red from the number of small florid vessels, and there are frequently spots of extravasated blood."

But, "when arsenic has been swallowed, the stomach is affected with a most intense degree of inflammation. Its substance becomes thicker, and in opening into its cavity, there is a very great degree of redness in the inner membrane, arising partly from the very great number of minute vessels, and partly from extravasated blood. Portions of the inner membrane are sometimes destroyed, from the violent action that has taken place in consequence of the immediate application of the poison. I have also seen a thin layer of coagulable lymph thrown out upon a portion of the inner surface of the stomach. Most commonly too, some portion of the arsenic is to be seen in the form of a white powder, lying upon different portions of the inner membrane."†

If we separate the ordinary from the occasional appearances here described, we shall find, that the statements of Dr. Yelloly and Dr. Baillie in some measure correspond. The former has however suggested, that when coagulable lymph is thrown out in the substance, or on the surface of the villous coat, it is to be deemed an unequivocal indication of previous inflammation. But this is a rare occurrence in dissections, and it may be also, that thick mucus will sometimes assume the appearance of coagulable lymph.‡ Certainly, there is a danger of confounding the ordinary vascularity of the stomach with the indications of *slight* inflammation, *and such indeed as we may expect to find in many cases of poisoning.*

2. *Digestion of the stomach after death.* This subject was first developed by the illustrious John Hunter, and since his days it has been illustrated by his pupils. That anatomist found repeatedly, on dissection, that the great end of the stomach was digested, and holes made in it. "To be sensible of this effect," says he, "nothing more is ne-

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* See Dr. Yelloly's paper, "On the Vascular Appearance in the Human Stomach *which is frequently mistaken for inflammation of that organ,*" in the Medico-Chirurg. Transactions, vol. 4, p. 371.—See also Edin. Med. and Surg. Journal, vol. 10, p. 236.

† Baillie, Amer. edit. p. 67, 68.

‡ Yelloly, ut supra.

cessary than to compare the inner surface of the great end of the stomach with any other part of the inner surface—what is sound will appear soft, spongy, and granulated, and without distinct blood-vessels, opaque and thick; while the other will appear thin, smooth, and more transparent, and the vessels will be seen ramifying in its substance, and upon squeezing the blood which they contain, from the larger branches into the smaller, it will be found to pass out at the digested ends of the vessels, and appear like drops on the inner surface." Again, he observes "that when the stomach is actually perforated, the edges of this opening appear to be half dissolved, very much like to that kind of dissolution which fleshy parts undergo when half dissolved in a living stomach, or when dissolved by a caustic alkali, viz. pulpy, tender, and ragged." Lastly, he remarks, that he found these appearances more frequent in those who had died a violent death. He relates two cases of this kind, in which the persons had died shortly after having their skulls fractured, and a third one where a man had been hung.

The cause of this appearance of the stomach is supposed by Mr. Hunter to be the action of the gastric juice on the coats of the stomach. And the reason why this effect is not produced during life, is, according to him, the constant resistance of the vital principle to its action. He also observes, that the power of the gastric juice is not confined to the stomach alone, since he has often noticed, that after it had dissolved the stomach in its usual place, the contents of the stomach would come in contact with the spleen and diaphragm, and partly dissolve the adjacent side of the spleen and diaphragm, so that the contents of the stomach were found in the cavity of the thorax, and had even affected the lungs in a small degree.*

Dr. Baillie's description of this phœnomenon is as follows: "In looking upon the coats of the stomach at its great end, a small portion of them frequently appears to be thinner, more transparent, and feels somewhat more pulpy than is usual; but these appearances are seldom very strongly marked. They arise from the action of the gastric juice resting on that part of the stomach in greater quantity than any where else, and dissolving a small portion of its coats. This is, therefore, not to be considered as a consequence of a disease, but as a natural effect arising from the action of the gastric juice, and the state of the stomach after death. When the gastric juice has been in considerable quantity, and of an active nature, the stomach has been dissolved quite through its substance at the great end, and its contents have been effused into the general cavity of the abdomen. In such cases, the neighbouring viscera are also partially dissolved. The instances, however, of so powerful a solution, are rare, and have almost only occurred in persons who, while in good health, had died suddenly from accident."†

Such is the explanation given of this appearance by the best anatomists both in England and France.‡ But there are certain qualifications urged to various parts of the above statements, which it is proper to mention.

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* Hunter, in Phil. Trans. vol. 62. † Baillie's Morbid Anatomy, Amer. edit. p. 75.

‡ Grimaud, professor at Montpelier, has confirmed the observations of Mr. Hunter in his dissections.—Foderè, vol. 4, p. 307.

In the first place, it is denied that the erosion of the stomach only occurs in those who have died suddenly from accident. Mr. Allan Burns mentions, that he had seen nine cases in which this solution had taken place, three of which were persons worn out by debilitating diseases, and in an emaciated and anasarcous state.* Dr. Haviland has also lately related a case of a young man who died of fever, but had previously enjoyed good health. The body was opened twelve hours after death, and the mucous membrane was found red and vascular, and spots of extravasated blood were seen below that coat. There were two holes in the stomach, the larger very near to the cardiac end of the small curvature, and on the posterior surface. Its size was more than an inch in length, and about half that breadth. The other was not far from the former, and also on the posterior surface, about the size of a sixpence. The edges of these holes were smooth, well defined, and slightly elevated. The coats of the stomach were thin in many spots, and in one in particular, nothing was left but the peritoneum—the mucous and muscular coats being entirely destroyed. Lastly, the diaphragm was perforated in its muscular portion with a hole large enough to admit the end of the finger.† Several other instances are recorded by various writers, where perforation was observed in patients who had died after an illness of greater or less duration.‡

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* *Observations on Digestion of the Stomach after Death*, in Edin. Med. and Surg. Journal, vol. 6, p. 132, 133.

† Dr. Haviland, in Trans. Cambridge, Phil. Soc. vol. 1. Annals of Philosophy, N. S. vol. 4, p. 292.

‡ See the London Med. Repository, vol. 4, p. 112; vol. 10, p. 416; vol. 19, p. 208. The Eclectic Repertory, vol. 5, p. 495, case by Mr. Want. New York Med. Repository, vol. 18, p. 287, case by Dr. Pascalis. American Med. Recorder, vol. 4, p. 151, case by Dr. Cheeseman. Quarterly Journ. Foreign Med. and Surg. vol. 2, p. 328, case of M. Segelas, in an infant eight months old. Her disease was diarrhœa and vomiting, and she had suffered under the former forty-five days, and under the latter twenty days previous to death. The perforation was not accompanied with any trace of inflammation. See also the same Journal, vol. 5, p. 297, for another case, by Dr Peters, in a female aged 52. I have also been favoured with the outlines of a case, which occurred in the practice of my brother, Dr. J. B. Beck. The patient laboured under hydrothorax, but had never complained of pain in the region of the stomach. She had never suffered with vomiting, and her appetite had been good until within a few weeks of her death. On dissection, five ulcers were found in the stomach, one of which perforated through the different coats. A more minute statement of this case will appear in the New York Med, and Phys. Journ. It appears that Chaussier has examined this subject, and given some general views concerning it, which are worthy of attention. "The causes, (according to him) which produce erosions and perforations of the stomach, are of two kinds; first, the destruction of a schirrous tumour, the progress of a cancerous ulcer; second, a morbid action of erosion, of ulceration which has commenced spontaneously at some point of the mucous lining of the stomach. The perforations of the first kind are not rare, but cannot easily be confounded with those which are the result of a caustic poison. Those of the second kind may be divided into acute and chronic; the first sometimes occurring in a very short space of time. The following are the characters given by M. Chaussier: The ulcerations vary in size,

Again, it is urged by Mr. Burns, that the digestion is not confined to the great end, as stated by Mr. Hunter and Dr. Baillie. In several instances, he found the *forepart* of the stomach perforated about an inch distant from the pylorus, and midway between the smaller and greater curvatures. As it is a fair inference from the statement of Mr. Hunter, that the coats of the stomach will only be acted on at that part on which the contents have rested, he conceives that these cases affect its general truth, and suggests in explanation, that the action may be owing to the gastric juice retained in the vessels which had secreted it.*

Lastly, Dr. Yelloly has suggested an objection, which appears in some degree to affect the doctrine itself. He observes, that in these cases of *partial* digestion, if an erosion had actually taken place, the minute extremities of the vessels must have been included in the destruction, and on injecting the arteries, an extravasation would necessarily be observed; but in many trials, particularly where the stomach

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shape, and place; they occur particularly at the basis of the stomach, and the parts corresponding to the spleen and diaphragm. The contents of the organ are then sometimes effused into the abdomen or the thorax if the diaphragm be perforated, but most commonly there is no effusion, from the adhesion of the parts to those in the vicinity. If the adhesions be broken, a viscous, unctuous liquor, not fœtid, flows out; it has sometimes the odour of musk, is always brownish, and mixed with blackish flocculi, as though fine charcoal were added to a mucous serum. The edges are soft, fringed sometimes with a blackish line more or less marked. Elsewhere the stomach retains its ordinary shape and consistence; it presents no appearance of thickening or inflammation: the capillaries of its mucous membrane appear, however, more developed, particularly in the vicinity of the perforation; this last sometimes forms in a few hours in people in health; most frequently after some days illness, and when no cause of external violence or poisoning can be suspected." When the perforation is the result of a caustic, irritating poison, its edges are of the same thickness as the organ; sometimes they are hard and callous; in the spontaneous perforation the edges are thin, and formed only by the peritoneal membrane, the two other coats of the stomach being more extensively destroyed than the serous one. In this case too, the opening is not so irregular as in that which results from the action of a corrosive substance. The circumference of perforations caused by nitric acid is yellow, from the chemical action of this substance. In the case of strong sulphuric acid it is black. *Almost always, when the perforation is the effect of poison, the parts not perforated are more or less inflamed*, while traces of the same affection are found in the mouth, the pharynx, and the intestinal canal; on the other hand, *for the most part in the case of spontaneous perforation, the unperforated parts present no appearance of inflammation*. This last character is not, however, constant; for, as on the one hand, perforations from poison are sometimes, though rarely, unattended by inflammation of the unperforated parts of the intestinal canal, so on the other, spontaneous perforations may be observed, in which there is inflammation of the stomach and intestines."—Quarterly Journal of Foreign Med. and Surg. vol. 3, p. 258, 259.

* Burns ut antea. In one case he found the stomach eroded, and demonstrated this to his class. He then stitched up the abdomen, and laid the body aside in a cold situation for two days. On again opening it, he found that the liver, where it lay over the dissolved part of the stomach, was pulpy; its peritoneal coat was dissolved, and its substance was tender to a considerable depth. At the same time, the other parts of the liver were as solid as before, and every other part was free from putrefaction.

was very thin, no such extravasation occurred.* Mr. Burns found, however, that the vessels were unable to resist the force of the syringe in injecting the body, and the cavity of the stomach was filled with wax.

The application of this subject, in legal medicine, is the distinction between it and erosion from the effects of poison. How important this becomes, will be hereafter shown, when relating the case of Miss Burns. But I cannot conclude this section without suggesting, that until this subject is more profoundly investigated and better understood, *erosion distinct from inflammation* should not be regarded as a positive proof of poison.

3. *Rupture of the stomach.* We are indebted to Dr. Crampton and Mr. Travers for some instructive cases of this dreadful disease. The patients in the midst of health are seized with the most acute and unremitting pain in the stomach, and a rigidness and contraction of the abdominal muscles, and death ensues after a few hours illness. On dissection, the contents of the stomach are found in the cavity of the abdomen, and a perforation is discovered, resulting from an ulcer of the mucous coat.†

It will immediately occur to the reader, that a termination so sudden and fatal may lead to suspicion, and the appearances exhibited on dissection would in some degree strengthen this, were it not understood, that death has and may occur from the natural cause in question, without the intervention of any poisonous substance.

I have now concluded what may be considered as general and introductory remarks to the subject of poisons. The symptoms and the appearances on dissection have been arranged in various classes, not because the system used for this purpose was deemed perfect, but that it seemed to be an approach to the truth, and at all events was preferable to the long catalogues of ancient writers, in which the symptoms and lesions not only of every class, but of every individual poison, were arranged indiscriminately. On approaching the consideration of individual poisons, I propose to notice their effects only as I find them warranted by the history of particular cases, and I shall endeavour to bear in mind the following remarks as a guide and a caution. "Systematic writers upon poisons have jumbled together the symptoms of various doses operating under different circumstances, without discriminating the constant effects, if there be any, from the common or usual effects; nay, they have drawn their descriptions of the effects of poisons not only from different poisons of the same class, but even from poisons of different classes, and from their effects upon animals of different classes. Poisons must still be studied in the way of induction. We must collect all the special facts and observations—we must compare and generalize them, and proceed no farther in our general inferences than these facts warrant."*

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* Edin. Med. and Surg. Journal, vol. 10, p. 287. As to digestion of the stomach *being rare or common*, Dr. Yelloly is of the former opinion. Dr. Joseph Adams, in reply, suggested that all his subjects were examined within a very short time after apparent death, and that the parts might have retained life sufficient to prevent the action of the gastric juice. (Lond. Med. and Phys. Journ. vol. 31, p. 178.) In the same volume, (page 3) is a narrative by Mr. Borret, of a man in high health, aged 64. who was hung, and his stomach examined 44 hours after death. It was found uninjured.

† Medico-Chirurg. Trans. vol. 8, p. 228. The case related in the London Med. Repository, vol. 5, p. 157, as occurring to Dr. Gastallier, of Paris, seems to have been of a similar nature.

CHAPTER XVI.

MINERAL POISONS.

ARSENIC. *White oxide of arsenic.* Modes in which it may prove poisonous. Internally. (*a*) Its exhibition by the mouth. Symptoms. Classification of these—when the patient survives the effects—when he lives beyond a day or two—when he dies within a few hours. (*b*) By injection into the rectum or vagina. Externally. (*a*) Applied to a wound or ulcer, or even to the skin. Effects of this. Cancer plasters. (*b*) By inhaling its vapours. Appearances on dissection, in those who survive several days—in those who die in a few hours. Whether putrefaction follows rapidly after death in these cases. Effects of arsenic on animals. Jaeger's experiments—Brodie's experiments. Chemical proofs. 1. Tests, or re-agents. (*a*) Lime-water. (*b*) Ammoniaret of copper. (*c*) Sulphate of copper. (*d*) Sulphuretted hydrogen. (*e*) Nitrate of silver. (*f*) Iodine, (*g*) Nitrate of potash. (*h*) Chromate of potash. 2. Reduction of the metal. (*a*) Its reduction with the black flux. (*b*) The garlic smell. (*c*) The tombac alloy. (*d*) Its reduction by the galvanic pile. Difficulties that may occur when the poison is mixed with animal or vegetable substances. Modes of removing these—effect of tests on various mixtures of arsenic with aliments and drinks. Inquiry into the degree of proof necessary to determine that arsenic has been administered—whether its reduction to the metallic state should be deemed indispensable—objections to this. Medico-legal cases—Miss Blandy—Nairn and Ogilvie—Miss Burns—Kesler. Antidotes—propriety of laws prohibiting the unrestricted sale of arsenic. *Arsenites. Arsenic acid. Sulphurets of arsenic. Black oxide of arsenic. Arsenical hydrogen. Metallic arsenic.* MERCURY. *Corrosive sublimate.* Modes of exhibition. Internally. (*a*) Its exhibition by the mouth. Symptoms. (*b*) By injection. Case of Sir Thomas Overbury. Externally, applied to a wound or ulcer, or to the skin. Appearances on dissection. Effects on animals. Chemical proofs. Operation of various animal and vegetable substances on corrosive sublimate—Effect of tests on these mixtures. Antidotes. *Red precipitate and red oxyd.* Other mercurial preparations. *Mercurial vapours, and mercury in a state of extreme division.* Injurious effects of these.

THE MINERAL POISONS are most frequently used as the instruments of suicide or of homicide, and they hence deserve the earliest and most minute attention.[*] I shall consider them in the following order;—

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* Edin. Med. and Surg. Journ. vol. 7, p. 86.

- Arsenic
- Mercury
- Antimony
- Copper
- Zinc
- Tin
- Silver
- Gold
- Platina
- Bismuth
- Sulphate of iron
- Lead
- Phosphorus
- Iodine
- Acids
- Alkalies and their carbonates
- Barytes and its salts
- Quicklime
- Hydrogenated sulphuret of potash
- Nitrate of potash
- Muriate of ammonia
- The gases
- Glass and enamel.

ARSENIC.

ARSENIOUS ACID, OR WHITE OXIDE OF ARSENIC.

The substance commonly known under the name of arsenic, is, according to chemical nomenclature, *arsenious acid*, or *the white oxide of arsenic;* and it has received these apparently incompatible names from the fact, that though more analogous to the oxides, yet it possesses some of the properties of acids. It is an artificial production, and is prepared principally in Saxony, from cobalt ores. Whilst the latter, in the crude state, are roasting for the purpose of obtaining zaffre, the vapours arising from the oxide are condensed in a long and large chamber, and to these potash is added. The mixture is then sublimed, and the white oxide is obtained, leaving potash with sulphur. This employment is a dangerous, and in a short time, fatal one; and, accordingly, convicts, whose punishment would otherwise be death, are condemned to it.[†]

Arsenious acid occurs in commerce in the form of shining semi-vitreous lumps, and when reduced to powder, bears some resemblance to white sugar. Its taste is generally said to be acrid and corrosive, leaving an impression of sweetness.[‡]

It may be poisonous either internally or externally exhibited. 1. *Internally*, by the mouth passing into the stomach, or by being injected into the vagina or rectum. 2. *Externally*, by being applied to a wound or ulcer, or by inhaling its vapours.

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[*] In noticing poisons, I shall omit as much of their chemical and botanical history as is practicable, consistently with the design of this work. The reader will be considered as generally acquainted with this preliminary information.

[†] Gordon's Inaug. Dissertation, p. 4. See a notice of this production in the Edinburgh Med. and Surg. Journal, vol. 11, p. 134. The dangerous nature of the vapours arising from the roasting of cobalt ores, appears to have been early known. They were considered so hurtful to the miners, that a prayer was formerly offered up in the German church, that God would preserve miners from cobalt and spirits.—Beckmann, vol. 2, p. 263.

[‡] Dr. Gordon doubts this statement, and observes, that when *first* tasted, it is always sweet like sugar, but afterwards somewhat acid. Page 9.

INTERNALLY, *(a)* Its exhibition by the mouth.

Hahnemann, who has written on this poison, proposes a classification of its effects into three degrees. When death follows the exhibition of the poison within twenty-four hours, it constitutes the first degree; and when later than twenty-four hours, the second degree; and when the case, though attended with dangerous symptoms, does not terminate fatally, it belongs to the third class.*

This arrangement is evidently useful, since it may lead to proper indications for the application of curative means; and it is important, as it must tend to increase our knowledge of the complicated symptoms arising from the exhibition of the poison.

A writer in the Edinburgh Medical and Surgical Journal, has presented us with a description of its effects according to the above arrangement, drawn from a careful comparison of all the cases which have occurred in the course of his reading. I shall copy this, and add such remarks and references as may appear to deserve notice.†

"In the slightest case in which the operation of arsenic is recorded as producing poisonous effects, the symptoms are, uneasiness of the præcordia, and a sense of heat there." This effect is often perceived in those who take it medicinally. "When the dose of poison is somewhat greater, but not sufficient to produce death, violent vomiting is commonly the first symptom, although in some instances it is preceded by a sense of heat in the tongue and throat; in other cases, these sensations are expressly mentioned as not felt during the whole course of the disease. In these cases, when the vomiting is instant, and the poison has been taken on a full stomach, the patient seems to owe his escape to the poison being discharged before it has time to act. The next symptom which claims our attention, is the purging, sometimes of blood; but purging occurs less frequently in this slight degree of poisoning, than in the more severe cases. In the region of the stomach and bowels, pain is frequently felt, but it is often rather an unsupportable uneasiness and oppression, than pain properly so called. The stomach is not described as swelling; and in one case, where there was hiccup, eructation, and difficulty of breathing, it is expressly mentioned that it was not tense or swelled.

A sensation of coldness, especially in the extremities, and cold sweat, seems to have been almost always present, with general paleness, and paleness of the countenance, and in some cases, languor, faintishness and a tendency to sleep. In this degree of poisoning, convulsions are not frequently observed, and the thirst and fever seem to arise from some irritation in particular persons, as they are seldom expressed. In one case only, is *ardor urinæ expressed.*[*]

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* Edinburgh Med. and Surg. Journal, vol. 7, p. 86. This will be as proper a place as any to mention, that the *smallest* quantity of arsenic may prove injurious, and it is said that *two* grains have caused death.

† The plan I shall pursue, will be, first, to quote the description from the authority already named, and then to add such peculiarities as may have been noticed in the cases that I have examined.

There are some peculiarities which occasionally occur, that also deserve notice. *Epileptic fits* were present in Dr. Roget's case, noticed below; and Dr. Gordon states, that Dr. Duncan, Jun. in his lectures, quotes several authors, and in particular, Alberti and Forestus, who have noticed this as a symptom.[†]

Paralysis has been repeatedly observed by Dr. Falconer, once in the hand, like lead, but in two other cases it was general. It began with numbness of the extremities, but there was no wasting.[‡]

"In the second degree of poisoning, from arsenic, where the patient lives above a day or two, the first complaints are heat and thirst, or vomiting, or inexpressible distress; the first is less frequently observed than the other two. Purging is not mentioned in any of the cases of this sort, but in one a fœtid stool was procured by a pessary, and in one, gripes are noticed; in two, the belly swelled; in one, there was great feebleness and lassitude, and in all, convulsions seem to have taken place—in one case impeding deglutition."

There is a very interesting case, belonging to this division, related by Mr. Murray. The patient survived seven days. The course of the symptoms was as follows—heat, thirst, pain in the region of the stomach, vomiting, which frequently recurred after drinking, occasional ineffectual attempts to go to stool. The pulse was frequent, one hundred to one hundred and ten, and not strong. Hoarseness, soreness of the eyes and shifting pains in the extremities. He voided his urine frequently. This illness did not confine him to bed, and indeed he rode several miles in order to consult Mr. Murray, while under its effects. The day before his death, the hoarseness increased, with a more anxious expression of countenance. He was found dead in bed.[*]

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[*] The cases which I have examined, with reference to this division, and for the purpose of verifying or correcting the symptoms given in the text, are related by the following persons:—*Mr. Murray*, of Alford, three cases in the Edinburgh Med. and Surg. Journal, vol. 18, p. 167. *Mr. M'Leod*, three cases in the Edinburgh Med. and Surg. Journal, vol. 15, p. 558. *Mr. Davies*, two children, London Med. and Phys. Journal, vol. 28, p. 345. *Mr. Bucknill*, in Ibid. vol. 29, p. 44. *Dr. Roget*, in the Medico-Chirug. Transactions, vol. 2. *Dr. Vandendale*, (Orfila, vol. 1, p. 143.) *Mr. Marshall*, five cases—the Turner family, supposed to have been poisoned by Eliza Fenning. *Mr. Shipman*, in the London Med. Repos. vol. 9, p. 455. *De Haen*, Ratio Medendi, vol. 3, p. 113. *Dr. Barnum*, in New-York Med. Repository, vol. 5, p. 43.

These cases verify the statement in the text in most of its leading particulars. In those of Murray, M'Leod, and Bucknill, the burning heat in the throat is expressly mentioned. Purging generally occurred, and in some instances it was bloody. In Bucknill's case, the discharge was so acrimonious as to excoriate the anus. In two individuals, there was tenesmus and constipation. In one case the urine was voided with difficulty. Numbness of the extremities, loss of power in them, general debility and faintness, are noticed in almost all. One of Murray's patients had soreness of the eyes; and in Davies' case, a child of nine years, a vesicular eruption commenced around the mouth and circumference of the eyes, which in a day or two formed a scab, and gradually fell off. In M'Leod's case, there were convulsive spasms, loss of the powers of speech and swallowing, and apoplectic appearances; but I suggest whether the administration of the sulphuret of potash might not have aided in producing these. These patients also, at an early period of their illness, had purple petechiæ on the chest and neck. In De Haen's case, cramps of the feet, with pruritus and partial paralysis, were present. In Vandendale's meteorismus abdominis, with loss of the hair and *nails of the hands and feet.* Mr. Shipman's case assumed the form of a marked case of enteritis.

[†] Gordon, p. 18.

[‡] Mem. Med. Soc. of London, vol. 2, p. 224. In a case seen by Mr. Bedingfield, paralysis of the extremities was produced. London Med. Repository, vol. 6, p. 227. And in another, by Dr. Hosack, a palsy of the muscles of the neck and right arm, was occasioned by the application of this poison to an encysted tumour.—American Med. and Phil. Register, vol. 3, p. 389.

" In the third degree of poisoning, where death takes place within a few hours, the symptoms succeed each other rapidly, or begin at the same time, and the fainting and general debility almost always precede the vomiting. The vomiting occurred in all the cases but two; purging or gripes in most of the cases; the matter passed by stool is in one case described as green, watery, and viscid. In one case there was vertigo, also general pains, and loss of speech. Convulsions did not occur often, but there was sometimes hiccup. In a few cases there was much heat and thirst; even in one, in which (a symptom more frequent than heat) there were complaints of a sensation of intense cold, and paralysis of the extremities with cold sweat. The pulse in the only case in which it is mentioned, was slow and languid; and death seems to have generally proceeded from exhaustion and rapid sinking of the vital powers. In none of these violent cases is there any mention of delirium, or affection of the mind, except in one, in which the poison was applied externally to the head."

Some peculiarities, in particular cases, must be added to these, and one which deserves repetition, is the circumstance that patients sometimes *do not vomit*. Wepfer mentions an instance of this kind. Chaussier relates of a man who swallowed arsenic in large pieces, and in whom the only symptoms were slight syncope on the approach of death. On dissection the arsenic was seen almost in the same state in which he had swallowed it, and it was not possible to discover the least appearance of erosion or inflammation. There are several other cases recorded, where the patients denied that they felt any *pain*.[†]

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[*] Edinburgh Med. and Surg. Journal, vol. 18, p. 167. The dissection of this patient will be mentioned hereafter. The case of Mr. Blandy also belongs to this division, but as I intend to notice it at length, I will not repeat the symptoms in this place.

[†] The following cases are instructive, and present some interesting peculiarities. They are related by the following observers:—*Dr. Tonnelier*, in Orfila, vol. 1, p. 118. *Dr. Laborde*, in Orfila, vol. 1, p. 120. *Dr. Yelloly*, Edin. Med. and Surg. Journal, vol. 5, p. 389. *Mr. Davies*, a child five years old, Lond. Med. and Phys. Journal, vol. 28, p. 345. *Mr. Pettigrew*, London Med. Repository, vol. 11, p. 525. *Mr. Soden*, (from London Medical Review,) Eclectic Repertory, vol. 2. p. 325. *John Hunter*, from Trans. of a Society, &c. Eclectic Repertory, vol. 1, p. 438. *Chaussier*, Edinburgh Med. and Surg. Journal, vol. 7, p. 92. *Morgagni*, vol. 2, p. 366.

In the cases of Yelloly and Laborde, both patients denied that they felt any pain.

And one of the most remarkable is the instance of a boy, eight years old, who swallowed a small quantity of a substance picked up in the streets, which contained arsenic. He lived twenty-one hours, and experienced no pain even on pressure, yet, on dissection, the stomach was found in a gangrenous state near the pylorus.*

It may appear an omission, were I not to state the symptoms generally, as enumerated by systematic writers; and I therefore copy the list given by Orfila, although the reader cannot fail, I believe, to remark, that it is far from being as useful, as when it is subdivided in the manner adopted in the previous pages.

"An austere taste, fetid mouth, frequent ptyalism, continual spitting, constriction of the pharynx and œsophagus, the teeth set on edge, hiccup, nausea, vomiting of a matter sometimes brown, sometimes bloody; anxiety, frequent faintings; heat of the præcordia; inflammation of the lips, tongue, palate, throat, and œsophagus; the stomach painful to such a degree as not to support the most emollient drink; the alvine discharges black, and of a horrible fœtor; the pulse small, frequent, concentrated, and irregular—sometimes slow and unequal; palpitation of the heart, syncope, unquenchable thirst, pungent heat all over the body—sensation as of a devouring fire—sometimes an icy coldness; breathing difficult; cold sweats; urine scanty, red and bloody; change of the features of the countenance—a livid circle round the eyelids; swelling and itching over the whole body, which is covered with livid spots, and sometimes with a miliary eruption; prostration of strength—loss of feeling, particularly in the feet and hands; delirium—convulsions, often accompanied with an insupportable priapism—falling off of the hair—detachment of the epidermis; and lastly, death."

It is rare (he adds) to see all these symptoms united in the same person; sometimes almost all of them are wanting.†

(b) By injection into the rectum or vagina. This is fatal in the same way as already described, but the inflammation affects the intestines more than the stomach. A horrible history is related of two women, "quibus per vaginam oxidum arsenici marito admotum est. Occubuere ambæ, harum una inopinato, et perdurante horrore, frigore, et urente vaginæ dolore correpta est, et post vomitus fere continuos, et deliria, elapsis 28 horis ab applicatione veneni, mortua est. Sectio monstravit abdomen non tumidum, nullas in cute maculas; labia vulvæ magna paulum tumida et rubra; in vagina, patula flaccida,

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The pulse in Yelloly's was slow and languid; in Laborde's, tranquil; in Tonnelier's, Hunter's, Pettigrew's, and Soden's, small, tremulous, and frequent. A comatose state preceded death in a few; but generally, the sensorial functions were not disturbed. In the astonishing case related by Metzger, (Schlegel, vol. 4, p. 22,) where he removed one ounce and thirty-five grains from the stomach after death, and considers that only equal to *one-third* of what was actually present, the patient laboured under most violent pain, vomiting, and diarrhœa, yet "*per totum hoc tempus animo constans, deque instante morte persuasissimus.*" He died convulsed. Stercoraceous vomiting is said by Dr. Gordon, (p. 19,) to have occurred, but I can find no case in which it is mentioned.

* London Med. Repository, vol. 2, p. 270.

† Orfila, vol. 1, p. 123.

pauca grana arsenici crystallini; os uteri sphacelatum et apertum; corpus ejus naturale; ventriculum fere sanum, duodenum inflammatum, multaque bile perfusum; pulmones lividos, fere nigros; in utroque cordis ventriculi polypos; reliqua viscera sana, sanguinem in omnibus vasis fluidum et solutum."*

In one experiment on a dog, forty-eight grains of arsenious acid, in the form of powder and fragments, were introduced into the rectum. He shortly after passed the whole of it by stool. Two days after, the same quantity, but pulverised, was introduced. This produced loss of appetite and dejection, and he died in eight days. The parts round the anus were excoriated, and the integuments detached, so that there was an ulcer of some extent. The mucous membrane of the intestines near the anus, was of a greenish grey, and above it of a bright red, for the space of six or seven inches—but in ascending upwards, it gradually diminished in intensity.†

EXTERNALLY, *(a) Applied to a wound or ulcer, or even to the skin.*

Of this, there are some instructive cases on record. Dr. Desgranges relates the following: A chambermaid had been so imprudent as to rub her head with an ointment containing a portion of arsenic, for the purpose of destroying vermin. Her head was perfectly sound, without the least scratch. But in six or seven days after, it began to swell; the ears, which were twice their natural size, became covered with scabs, as were also several parts of the head; all the glands of the jaw and neck rapidly enlarged; the face was tumefied, and almost erysipelatous. Her pulse was hard, tense, and febrile; the tongue parched, and the skin dry. To these were added excruciating pain, and a sensation of great heat. Vertigo, fainting, cardialgia, occasional vomiting, thirst, ardor urinæ, constipation, trembling of the limbs, and delirium were also present. Dr. Desgranges treated the complaint as an inflammatory disease, and in a day or two after, the body, and especially the hands and feet, were covered with a considerable eruption of small pimples, with white heads like millet. This eruption in time dried up and desquamated, and she finally recovered, but during her convalescence the hair fell off.*

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* Gordon's Dissertation, quoted from the Comment. de Rebus. Lipsiæ, 1793, tom. 35. Metzger probably mentions the same case, p. 390; and I am in doubt whether the above is also not the same that is said to have happened in Denmark. See London Med. Repository, vol. 9, p. 246. If not, we have several instances of this most atrocious crime; for in the work last quoted, is another stated, of a female, in the *Department de l'Ourthe* in France, aged forty, who died, after a short illness, which was manifested by a considerable tumefaction of the genitals, by uterine hæmorrhages, vomiting, and abundant purgation. This woman confided to two of her neighbours, that her illness was occasioned by powdered arsenic, which her husband, *in concubito*, had himself insinuated into the parts. The body was examined by the proper officers. They declared that they found the vulva and vagina in a state of gangrene—the abdomen much distended with air, and the intestines inflamed and gangrenous. The culprit was arrested, convicted, and executed.

It is also mentioned, that the Copenhagen College of Medicine, when the case above cited was referred to them, and when some doubted the possibility of this mode of poisoning, made some experiments by introducing arsenic into the vagina of mares. It produced inflammation, tumefaction, and death. On dissection, the genital parts were found gangrenous, and there was an effusion of bloody serum in the abdomen, with traces of inflammation in the stomach, intestines, lungs, aorta, thoracic duct, &c. London Med. Repository, vol. 9, p. 246, from the *Journal de Medicine*. See also, with reference to this mode of administration, the case mentioned in page 164, vol. 2.

† Orfila, vol. 2, p. 541.

Belloc has recorded a similar instance. A female, aged fifty-six, in good health, but of a delicate constitution, had the imprudence to wash her body with a solution of arsenic in water, to cure the itch. Her body swelled prodigiously, and she was covered with an erysipelatous eruption. She dragged out a painful existence for two years, but during life, was always afflicted with a trembling of the limbs.†

Roux amputated the schirrous breast of a girl of eighteen. The wound did well, but while rapidly closing, an ulceration, accompanied with slight darting pains, made its appearance in the centre. He applied the *arsenical paste*, as it is called in France, and of which arsenious acid is the basis. The day after, she was seized with violent cholics, and experienced some vomiting. Two days afterwards, she died in violent convulsions. The body, which was covered with large ecchymoses, quickly putrefied, and on opening it, the internal surface of the stomach, and a great part of the intestinal canal, were found in a state of inflammation, and sprinkled over with black spots.‡

To these I will only add the following. A lady found some arsenic, and not knowing what it was, put a little in her mouth, in order to taste it. She was certain, however, that she had not swallowed any of it. No manifest effects occurred immediately, but in twelve hours she became vertiginous, and convulsions supervened, and continued during the day and night. The day following, her body, but especially her head, face, and neck, were all covered over with red spots like measles, with excessive glowings and *tinnitus aurium*. Her other symptoms, however, began to abate, and in five or six days she recovered, but remained deprived of a fine constitution for several years.§

There can be no doubt, that the various quack preparations used both in England, France, and this country, for the cure of cancer, and which have arsenic for their base, have in most cases proved destructive to the patients. Certainly governments ought to interdict their application, except in the hands of regular practitioners.||

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* Foderè, vol. 4, p. 123.

† Belloc, p. 121.

‡ Orfila, vol. 1, p. 124.

§ Case by Dr. Thomson, in Edinburgh Med. Essays, vol. 4. p. 41.

|| In France, the *pate arsenicale* is used. It consists of cinnabar 70 parts, sanguis draconis 22, and arsenious acid 8, made into paste at the time of applying it. In England, *Plunkett's ointment*, made of arsenious acid, sulphur, and the powdered leaves of the ranunculus flammula and cotula fœtida; and *Davidson's remedy for cancer*—arsenious acid and powdered hemlock (Paris' Pharmacologia, p. 209.) In the United States, *Davison's cancer plaster*—some preparation of arsenic.—As far back as the time of Haller, cases are related of death ensuing from the external application of arsenic to cancers and ill-conditioned ulcers. (Edinburgh Med. and

During the period of the plague of London, amulets of arsenic were worn suspended over the region of the heart, as a preservative against infection. Even this proved dangerous, and Dr. Mead severely reprehends it.

(b) By inhaling its vapours.

I have already adverted to the effects produced on the miners in Germany, and will now mention those caused in the copper smelting-works of Cornwall and Wales, in consequence of that metal in its crude state being mixed with arsenic. Dr. Paris states, that in their vicinity, "horses and cows commonly lose their hoofs, and the latter are often seen in the neighbouring pastures crawling on their knees, and not unfrequently suffering from a cancerous affection in their rumps, whilst the milch-cows, in addition to these miseries, are soon deprived of their milk. The men employed in these works are more healthy than we could *à priori* have supposed possible, but the antidote on which they rely with confidence, whenever they are infected with more than an ordinary portion of arsenical vapour, is *sweet oil*, and an annual sum is allowed by the proprietors in order that it may be constantly supplied."

It deserves notice, he adds, that the smelters are occasionally affected with a cancerous disease in the scrotum, similar to that which infests chimney-sweepers.*

The effects of the vapours of arsenic in the laboratory are no less marked. "Whilst Tachenius (says Van Swieten) endeavoured to fix the arsenic, by repeated sublimations, the vessels being open, he inspired a very sweet air, but in half an hour felt the consequences of his imprudence. He not only breathed with difficulty, but suffered convulsions in all the members of his body, and passed bloody urine with great pain."† Dr. Gordon mentions the following as occurring to himself. Whilst subliming arsenic, the vessel broke from the heat, and on removing it hastily from the fire, he inhaled a small quantity. A sense of pain and tightness about the præcordia was immediately felt, with a difficulty of breathing and violent cough. The pulse was not changed, but weaker and quicker than natural. On the next day, all the symptoms were gone except the cough, nausea, and anorexy. These were removed by a cathartic.‡

Appearances on Dissection.—According to the division previously adopted, we shall separate these into two classes, and notice first the appearances of such as survive several days.

The cases of this class are few in number, and they are liable to lead to wrong inferences, since from the length of time, other causes, as previous disease, or the action of remedies, may modify their results.

Surg. Journal, vol. 14, p. 643.) Dr. Francis mentions a case, where an ointment containing arsenic was applied to a tumour. Paralysis shortly followed—every joint seemed to be enlarged and tumid—the intellectual functions were nearly destroyed, and death ensued *suddenly and unexpectedly*.—New-York Med. and Phys. Journal, vol 2, p. 28.

* Paris' Pharmacologia, p. 209. † Gordon, p. 15. ‡ Ibid, p. 16.

I shall follow my former guide at this time, and then mention some additional cases. "In three cases," he observes, "the body is mentioned as discoloured or marked with livid spots, in one even blistered, and one was highly fetid. Two only were examined internally. In one, the intestines were inflated, and the intestines and stomach red, with turgid vessels; in the other, the fauces and stomach were yellow, and the heart, spleen, and lungs, dark blue."*

Mr. Henry Earle communicated a case to Mr. Brodie, of a woman in St. Bartholomew's hospital, who had taken arsenic, but who recovered of the immediate symptoms. She died at the end of four or five days, and, on examination, extensive ulcerations were found in the mucous membrane of the stomach and intestines.

The case related by Mr. Murray, and which has been already noticed, is very interesting, inasmuch as the individual lived seven days, and during that period retained a considerable portion of strength. His body was examined three days and eight hours after death. The right ear and scalp were of a deep blue colour. The back, from head to foot, was livid; on the chest and belly there were several spots and streaks, some green and others blue, while the shoulders and neck were mottled with livid ones. The penis was much swollen and red, and the scrotum was enlarged and of a dark blue colour. On opening the abdomen, several ounces of a high-coloured liquid were found. The outer surface of the stomach, along the whole of its larger curvature, was of a dark red colour, strongly marked. On opening that viscus, its internal surface was found of a brighter red, with lighter spots interspersed. The duodenum, through nearly its whole extent, and round it, was of a dark purple colour, and its internal coats were pulpy, thickened, and easily separated from the peritoneal covering, while in one roundish spot, of the size of a crown-piece, the villous and muscular coats were entirely wanting. Red patches were also observed on the inner surface of the jejunum and ileon. The stomach and duodenum contained about a quart of a brown semi-opaque, thickish liquid. The lungs and heart were healthy. The spleen was gorged with blood, and the liver healthy. The pharynx was of an unusually red colour.†

Metzger quotes a case from Zittman, where two grains of arsenic were first administered, and in two days after, an emetic. Four days after, the dose of arsenic was repeated. On dissection, eight ounces of coagulated blood was found in the stomach, and this viscus was covered with gangrenous spots. The heart resembled a baked pear (a une poire sortant du four.) ‡

Lastly, a case is mentioned by Lieutaud, where a man, who took a drachm, died in eight days. The stomach was deprived of its villous coat, and was filled with fluid and charry matter. The pylorus was gangrenous. The intestines of a reddish black colour.*

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* Edinburgh Med. and Surg. Journal, vol. 7, p. 87.

† Edinburgh Med. and Surg. Journal, vol. 18, p. 159.

‡ Metzger, p. 388. He also mentions that he has noticed inflammation of the liver in this class of poisoning, p. 392.

The appearances observed on those who die after a few hours illness, are sufficiently various, although they agree in some leading particulars. The following may be deemed a correct abstract, drawn from the histories of between twenty and thirty cases.†

The external appearance of the body is not uniform. In some, probably in a majority of cases, it is marked with livid stripes or patches, of various sizes, and in others with small ecchymoses. Several instances are related, where the posterior part was black, and in one case the body was swoln, and of a blueish green colour.‡

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* Bigsby, in London Med. Repository, vol. 5, p. 101.

† In preparing this, I have derived great assistance from the Edinburgh Med. and Surg. Journal, as already quoted, but particularly from a paper in the London Med. Repository, (vol. 5, p. 97,) entitled, "*On the Effects of Arsenic as they appear in the Human Body after Death*, by J. J. Bigsby, M.D. of the York Hospital, Chelsea. The author classifies the appearance of each viscus in columns, notices the age of each individual, and the time which elapsed between taking the poison and death. The cases analyzed by him are twenty in number, viz.—1. A woman, aged 44, died in 9 hours—from *Wolfius*, in Ephemerides Nat. Cur. 2. A girl, aged 5 years, died in 12 hours—*Davies*, in London Med. and Phys. Journal. 3. A Woman, aged 60, died in 12 hours—*Morgagni*, Epist. Anat. 69, Art. 3. 4. A man, died in a very short time—*Morgagni*, Epist. Anat. 69, Art. 5. 5. Child, died in 12 hours—*Etmuller*, Ephem. Nat. Curios. 6. Woman, dose half an ounce, died in 13 hours—*John Hunter*, Transactions of a Society for the Improvement of Medical and Chirurgical Knowledge, vol. 2, p. 63. 7. Woman, aged 27, died in 15 hours—*Laborde*, (Orfila.) 8. Woman, aged 18, died in 15 hours—*Orfila*. 9. Man, died in 16 hours—*Bonetus*. 10. Child, aged 8 years, died in 21 hours—*London Med. Repository*, vol. 2, p. 270. 11. Boy, 17 years, died in 21 hours—*Dr. Yelloly*, Edinburgh Med. and Surg. Journal, vol. 5. 12. Child, died in 24 hours—*Foderé*. 13. Child, 3 years, died in 33 hours—*Davies*, London Med. and Phys. Journal, vol. 28. p. 345. 14. Woman, time unknown—*Whately*, Med. Observ. and Inquiries, vol. 6, p. 337. 15. Woman, time unknown—*Jones*, Orfila, vol. 1, p. 140. 16. Man, died in eight days, dose one drachm—*Lieutaud*. This I have already noticed. 17. A child, mentioned by *Wepfer*. 18. Man, mentioned by *Chaussier*, Edinburgh Med. and Surg. Journal, vol. 7, p. 92. 19. A man, quoted by Orfila from Marc. 20. A man, quoted by Orfila from Sallin. To these I may add the following:—21. The astonishing case by Metzger, as already mentioned. (Schlegel, vol. 4, p. 21.) 22. Man, aged 22, died in about five or six hours—*Soden*, in London Med. Review for April, 1811. (Eclectic Repertory, vol. 2, p. 325.) 23. A man, aged 19, took an ounce, died in seven hours—*Pettigrew*, from his Anniversary Oration, London Med. Repository, vol. 11, p. 525. 24 and 25. Two cases examined by *Deveaux*—Foderé, vol. 4, p. 263. 26. A boy, eight years old, lived 21 hours—London Med. Repository, vol. 2, p. 270.

‡ Gmelin says, that in some cases the hair, nails, and joints have separated on the application of the slightest force. It is, however, very doubtful whether, according to the assertion of some writers, *putrefaction* follows rapidly after death. It would rather seem, from the result of experiments on animals, that bodies do not mortify sooner from this cause, than from many other diseases. Metzger, in a case examined eighteen days after death, and eight days after burial, found no fœtor, or sign of putridity, and there were no livid spots, except on the ends of the fingers. (Metzger in Schlegel, vol. 4, p. 22.) Professor Pfaff, of Kiel, examined a body poisoned by arsenic, and although it had laid fourteen days in the grave, yet putrefaction had not made any visible progress. (London Med. and Phys. Journal, vol. 16, p. 95.) Dr. Welper, of Berlin, has made similar observations, and found the bodies changed, in some degree, to the state of mummies. (Gordon, p. 24.) There is also

In one case the tongue was inflamed and thickened. In three, the œsophagus was found inflamed; and, in one of these, the symptoms during life, and the appearances after death, were very mild; but, in the other two, both were violent.

The nature of the contents of the stomach has been various, both as to colour and consistence, and this of course depends greatly on accident. In twelve cases out of twenty-three, arsenic in substance was found among the solids and fluids, while, in a few instances, the most minute chemical investigation could not detect the least trace.

The villous coat of the stomach is very generally in a high state of inflammation, but in three cases none was discoverable. In twelve cases, this coat was found eroded or abraded, and this was often seated in a diffuse surface of intense inflammation. The erosions have the form of angular, or somewhat circular depressions, with regularly defined or ragged edges, in which, and on the surface, pieces of arsenic were very commonly discovered, and in one case actually agglutinated to the parts. This substance has also been seen adhering to the inflamed portion of the stomach, with an increase of the morbid effect in its vicinity. The abrasions are of various dimensions, and, in extremely violent cases, extend over the whole cavity, and leave the rest of the stomach extremely thin, and almost transparent.

Sometimes the villous coat is very easily separable. The inflammatory process seems to be proportionate to the time that elapses between death and the exhibition of the poison, and relatively according to the empty or full state of the stomach at the time, and the medical treatment employed.

The muscular coat is not often named, but in violent cases it is also affected. Corrugation of the stomach is a very common appearance.

The peritoneal coat is not often affected, but when it is so, it is found inflamed. In milder cases, the stomach has been found thickened in several places, as if by coagulable lymph; and in one case, indeed, a thickening of the coats was the only alteration observable.

Gangrene was observed in three cases, near the pylorus.

The intestines partake of similar disease, but not so violently. The

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a curious case related by Dr. Gordon, from the Trans. of the Phys. Med. Soc. of Erlangen, 1812. A servant-maid poisoned three heads of families with oxide of arsenic. Suspicion was not excited for a length of time, but the bodies were finally dug up. One had been buried two years; the second, fourteen months; and the third, five months. Putrefaction had progressed very slowly. The skin resembled mahogany, and cut like the rind of an old cheese. The adipose substance, and muscles, of the abdomen, were converted into a mass resembling lard or cheese, (adipocire?) and the peculiar odour from the graves resembled fœtid cheese. No poison could be detected by the use of tests. Dr. Baehman was ready to hang the female, and endeavoured to support his opinion by various cases, tending to show that the administration of arsenic retarded putrefaction. The female, however, confessed her crimes, and thus prevented the necessity of acting on this doubtful, or at least imperfect proof.—Gordon, p. 22 to 27.

mucous membrane of the duodenum in particular, is usually inflamed to a high degree—it has even been eroded. Portal has observed it actually perforated with a ragged orifice. The inflammation declines gradually in passing down the intestines, and usually disappears in the larger ones, although they have been met with of a reddish black colour.

Three cases are mentioned, two by Dr. Baillie, and one by Mr. Davies, where, on examination, the rectum was seen diseased; in one instance, high inflammation, and in the remainder, ulcers and gangrene.

The peritoneal coat of the intestines is sometimes more vascular than natural. The duodenum and jejunum have been seen thickened, and the colon corrugated.

The liver is often spoken of as sound, but in one case it was grey, and in another gorged with blood.

The bladder was in one instance whiter than usual on its internal surface, and in Mr. Soden's case, it was contracted to the size of a walnut.

The lungs are very generally described as affected. In some instances they are livid, or have livid spots on their surface. In one case they were inflated, and in another flaccid.

The brain has seldom been examined. It is generally natural, but in one history it is stated as unusually turgid on its external face, and the plexus choroides as very vascular.

The heart is usually natural. Its cavities are often found filled with fluid blood. In one case it was flaccid.

The blood seems to have differed very considerably; at one time being black and coagulated; at another, black and fluid; and at a third, florid and fluid.

Effects of Arsenic on Animals.—This deserves consideration, from the light it may afford in determining on the nature of symptoms and morbid appearances in the human system. Several able observers and experimentalists have directed their attention to this point, and I shall notice the more important results obtained by them.

Dr. Jaeger, of Stuttgard, examined the effects of this substance on all classes of organized bodies, vegetable and animal; and most of his experiments were made with a solution of the white oxide in water, in the proportion of one to sixteen. He found it a general and quick poison for plants at every period of their life, with the exception perhaps of a few of the simplest forms of vegetable existence. Their various parts died in succession, as the particles of the poison reached them. In animals, death was preceded in every instance, from the infusory animalculæ up to man, by inordinate motions, and the secretion of lymph was increased most remarkably from the mucous membranes. Frequent fluid stools took place in all classes of animals; in those in which mucus is secreted on the surface, it was remarkably increased, and crabs ejected a great deal of froth from the bronchial openings. The power of voluntary motion, and susceptibility for external stimuli, decreased; the respiration of those animals which breathe by lungs, became difficult and laborious, and warm-blooded animals experienced extraordinary thirst. In birds and mammalia, frequent and violent vomiting took place, and commonly was the commencement of the scene to which convulsions put an end. Rabbits, however, which ruminate, did not vomit.

Arsenic exerted the most powerful effects when it was injected into the veins, or applied to a bleeding wound;[*] next, when it was introduced into the stomach, but less so when it was injected into the large intestines, which have fewer absorbing vessels. Applied to the sound skin, and to a wounded muscle, if dry, it seldom produced any effect; and animals covered with scales or shells did not suffer at all from the external application of arsenic. Applied directly to the nerves, it was inert. Lastly, he found that animals were never killed more certainly or quickly by arsenic, than when it was injected into the abdomen. But upon this he lays no stress, as the same effect was produced by most infusions.

In whatever way the arsenic was applied, Dr. Jaeger observed after death no change upon the skin. The gullet, and in birds the crops also, exhibited generally a slight reduess; and further down, purple-red stripes, more numerous in the vicinity of the cardia, which, as well as the stomach itself, in animals having a soft villous coat to their stomachs, was sometimes of an uniform purple-red colour, and sometimes spotted with it. The muscular stomach of graminivorous birds, however, shewed no appearance of redness; and in the aponeurotic portion of the stomach of a horse poisoned by arsenic, there were no traces of inflammation, which was otherwise general. The villous coat of the stomach is almost always softened, and, as if macerated, and also somewhat swollen; and, in general, it can be easily torn, or rubbed off in pieces with the finger, from the coat beneath it. The inflammatory redness is not seated in the villous coat, which remains perfectly white, but in the nervous coat, which is remarkably red, and exhibits every where purple-red warts or eminences. The author, however, often saw this separation of the villous from the nervous coat, without any inflammatory redness of the latter. These changes continue, though in a less degree, through the small, to the vicinity of the large intestines, which are in general free from them, and only contain an increased quantity of effused mucus; but the rectum again is inflamed, and its inner coat swollen and softened. These appearances are not constant, and are very various in degree.

The other mucous membranes were less generally affected, but he sometimes found the trachea red and inflamed, and in one instance the urethra of a dog. In no instance real inflammation of the peritoneum, but its vessels were always turgid with stagnating blood. The voluntary muscles were constantly and universally rigid; the limbs sometimes bent, but generally extended; the heart, urinary bladder, gall-bladder, and intestines, were rarely contracted, but frequently distended by their contents. The veins, especially of the abdomen, were constantly turgid with much black fluid blood, and a similar stagnation was observed in the cavities of the heart, especially of the right side. The lungs in general were natural, as was also the brain.

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[*] There can be no doubt of the truth of this statement. Dr. Gordon quotes the following experiments, given to him by his friend Dr. Campbell, which prove how *small* a quantity *externally* applied is sufficient to destroy life. Five drops of a saturated solution of the white oxide of arsenic were placed in a wound in the neck of a young cat. The animal was seized with vomiting, and died in four days. The stomach internally was much inflamed, near the pylorus, and the small intestines were also greatly inflamed, both internally and externally. In another instance, two drops of *arsenic acid* (the effects of which only differ in being more powerful and rapid) were put on the head of a cat, and she was dead in 24 hours. Vomiting took place, and the stomach and œsophagus were inflamed.—Gordon, p. 19.

Putrefaction seemed neither to be hastened nor retarded by their being poisoned with arsenic, whether they were buried or not. The generation of infusory animals, the production of larvæ and subterraneous vegetation in and about the bodies of poisoned animals, took place as usual. Dr. Jaeger was particular in these observations, from its being a disputed point. He, however, remarked, that the immediate contact of the arsenical solution seemed in some degree to retard the putrefaction of the part to which it was applied, in sufficient quantity.

As to the local effects of arsenic, he observed that when applied to the sound skin, it seldom injured it. If applied to a wound, it never, after death, was observed to be gangrenous or inflamed—was rarely swollen, but generally pale; and, for a considerable extent, the subcutaneous cellular membrane was filled with much stagnant, gelatinous fluid. The œsophagus, stomach, and intestines, were commonly, though not always, inflamed when arsenic was administered by the mouth. He never noticed real erosions, ulcerations, and gangrene of the viscera. In the horse already mentioned, and into whose jugular vein two ounces of arsenical solution were injected, and which was put to death twenty-nine hours afterwards, there were only some discoloured spots in the left ventricle.*

Mr. Brodie, of London, performed numerous experiments on animals with arsenic, and, in doing so, either applied it to a wound, or injected it into the stomach. The results were similar in all essential circumstances. The symptoms were, 1. Paralysis of the hind-legs, and afterwards of the other parts of the body: convulsions, dilatation of the pupils of the eyes, and insensibility. 2. A feeble, slow, and intermitting pulse. 3. Pain in the region of the abdomen; preternatural secretions of mucus from the alimentary canal, and sickness and vomiting in those animals which are capable of vomiting. These three classes of symptoms respectively indicate disorder of the heart, brain, and alimentary canal. Mr. Brodie also found that the symptoms occurred sooner when the arsenic was applied to a wound, than when it is given internally.

In whatever way the poison is administered, the inflammation is confined to the stomach and intestines. He never observed any appearances of it in the pharynx or œsophagus.† This inflammation took place more readily indeed from the external application of the poison, than from its administration internally, and it preceded any appearance of inflammation of the wound. The degree of inflammation varied considerably. In some it was very slight, in others considerable, and it appears to be greater or less according to the time which elapses before the animal dies. The mucous membrane of the stomach and intestines assumes a florid red colour—becomes soft and pulpy, and is separable without much difficulty from the cellular coat, which has its natural appearance. In some instances, there are small spots of extravasated blood on the inner surface of the mucous membrane, or between it and the cellular coat, and this occurs independently of vomiting. Mr. Brodie never found ulceration or sloughing of the stomach or intestines; but he suggests, that if the animal survives for a certain length of time after the inflammation has begun, it is reasonable to conclude that it may terminate in one or other of these ways. And it is important not to mistake the layers of coagulated blood for sloughs.[*]

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* Review of Jaeger's Inaug. Dissert. *de Effectibus Arsenici in Varios Organismos*, &c. in Edinburgh Med. and Surg. Journal, vol. 7, p. 80 to 84.

† Dr. Campbell, however, in several experiments with the white oxide externally

I shall lastly mention the result of a number of experiments made by Dr. Duncan, Jun. and Dr. Campbell. They are summed up by the former as follows: "1. Arsenic does not act chemically on animal matter, living or dead. 2. Its chief effects are to produce a disease somewhat analogous to cholera morbus, whether it be taken directly into the stomach itself, or inserted into the subcutaneous cellular membrane of a remote part, or applied to a delicate membrane. In some few cases, where the action of the poison is most intense, death occurs from the sickness or fainting, without vomiting or purging. 3. Frequently a considerable interval intervenes between its being received, even in solution, into the stomach, and its action. 4. Neither paralysis of the voluntary muscles, nor convulsions, nor delirium, nor coma, nor disordered respiration, or circulation, are ordinary symptoms of the disease produced by arsenic. 5. After death, we were frequently unable to discover any organic lesion, and we generally found that the inflammation was less, in proportion as the arsenic was more speedily fatal."[†]

As a supplement to these quotations, I may add some facts which were elicited on an extraordinary trial, which took place in 1812, in England. The prisoner, Daniel Dawson, was indicted for poisoning several horses at Newmarket. He effected this by injecting arsenical solution, with a syringe, into the watering troughs. Shortly after taking it, the animals staggered and rolled about in great agony, and

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applied, found the *œsophagus greatly inflamed.* This appearance was witnessed by Dr. Gordon. (Gordon, p. 20.) Orfila mentions it as a common circumstance in persons dead from poison, and he also quotes a case in which it was distinctly observed. (Orfila, vol. 1, p. 140.)—See also the cases of Blandy and Ogilvie hereafter cited.

[*] Edinburgh Med. and Surg. Journal, vol. 8, p. 459, from Phil. Transactions. From his experiments, Mr. Brodie draws the conclusion, that arsenic does not produce its deleterious effects, until it has passed into the circulation.

[†] Edinburgh Med. and Surg. Journal, vol. 11, p. 127.

they appeared to be in great agony from the intestines. Mr. Bowles, veterinary surgeon, opened a colt, and found the stomach and intestines extensively inflamed. He also mentioned in his testimony, that he had poisoned horses by way of experiment, and on opening one of them, the same appearances were found as in the colt. The water in the trough was proved to contain arsenic, and the additional testimony was so conclusive, that the prisoner was condemned and executed.[*]

CHEMICAL PROOFS. These form the third and most important mode of proof, in cases of poisoning, and I shall state the numerous ones proposed for the detection of arsenic, with as much conciseness as possible, although I may at the same time observe, that the ample discussion which all of them have undergone, renders a full notice very necessary.

Some remarks on the SOLUBILITY of arsenious acid, are previously requisite. Chemists formerly differed greatly in their statements on this point. According to Bergman, eighty parts of water, at the temperature of sixty degrees, dissolve one part, while the same quantity is dissolved by fifteen parts of boiling water. Navier asserts, that eighty parts of boiling water are requisite to dissolve one of the oxide; while, according to Hagen, thirty grains require four ounces of boiling water to dissolve them. These discordant results led Klaproth to investigate the accurate proportions, and the results of his experiments are as follow. Four hundred parts of *cold* water, at the temperature of sixty degrees, dissolve one part of white oxide; while only thirteen parts of *boiling* water are requisite to dissolve the same quantity. He also examined how much of the oxide would be retained by the boiling water, after it was cold, and found that one hundred parts of water retained three of the oxide, and the remainder separated in the form of tetrahedral crystals.[†]

Chemists have very generally assented to the correctness of these experiments,[‡] and the practical direction to be drawn from them is, that boiling water should be employed in all cases which require examination. It is also advisable to employ a somewhat larger proportion of water than is indicated above.

It may also be mentioned, that alkohol, in the proportion of eighty parts, dissolves one of arsenious acid.[§]

The methods proposed for detecting the presence of arsenic, are, 1. The application of certain re-agents or tests to its solution, and

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[*] Edinburgh Med. and Surg. Journal, vol. 8, p. 351. Edinburgh Annual Register, vol. 5, part 2, p. 112. Some systematic writers assert that arsenic is innoxious to horses, but certainly the above facts contradict this opinion.

[†] Annals, vol. 4, p. 182. Klaproth suggests that the cold of winter may produce some modifications in the latter proportions.

[‡] The experiments of Fischer led him to the result, that white oxide of arsenic is insoluble in water, and that it must be changed into an acid by combining with a greater portion of oxygen, before this can take place. Mr. Richard Phillips has, however, fully shown the incorrectness of this opinion.—Annals of Philosophy, vol. 7, p. 33, and vol. 8, p. 152.

[§] Brande, p. 264.

2. Its reduction to a metallic state. Of the first class, the following may be mentioned.

(*a*) *Lime water*. This gives a fine white precipitate, with arsenious acid, of arsenite of lime, soluble however in an excess of the arsenious solution. Among the Germans, it appears to be a favourite test. Jaeger recommends that it should be used recently prepared and hot. He found it sufficiently delicate to precipitate one thirteenth of a grain of arsenic when dissolved in one hundred grains of water, or one fortieth in fifty grains.*

(*b*) *Ammoniaret of copper* has also been recommended by German chemists as a very delicate test. In the state of saturated solution, it strikes an evident green colour with a solution of the white oxide, containing one five hundredth of a grain dissolved in fifty grains of water.† Orfila, who in his work calls it the *sulphate of ammoniacal copper*, observes, that this test, of all those furnished by copper, deserves the preference, on account of its extreme sensibility. It must however be noticed, he adds, that if this sulphate of ammoniacal copper be much concentrated, the precipitation will not take place.‡

An objection of importance has however been pointed out by Rose against it. If any of the fluids to be operated on contain tannin, as tea for example, this re-agent will produce no effect.§ This is evidently calculated to weaken its value.

(*c*) *Scheele's green* is another test derived from the application of a salt of copper to the arsenious acid. It is so named from its discoverer. In his Chemical Essays, he directs that a certain quantity of sulphate of copper be dissolved in water, and that this solution be aided by heat. The same quantity of the potash of commerce, and a less portion of the white oxide of arsenic, are then to be dissolved, in another vessel, in water. The latter solution is to be strained through linen, and a small quantity of it added from time to time to the dissolved sulphate of copper. A beautiful grass-green precipitate is deposited, which on being washed and dried, forms the paint in question.‖

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* Edinburgh Med. and Surg. Journal, vol. 7, p. 84. Lime-water enters into the processes recommended by Rose and Fischer.—See Orfila, vol. 1, p. 135 and 136.

† Jaeger. ‡ Orfila, vol. 1, p, 108. § Jaeger.

‖ Murray's Chemistry, vol. 3. p. 356. "To a little of the arsenical solution add a single drop of the solution of *carbonate* of potash, and a few drops of a solution of sulphate of copper. The presence of arsenic will be manifested by a yellowish-green precipitate." (Henry, vol. 2, p. 270.) "Arsenite of copper, called Scheele's green, is prepared by the old prescription of mixing a solution of two parts of sulphate of copper in 44 of water, with a solution of two parts of *potash of commerce*, and one of arsenious acid, also in 44 of water." (Ure, Art. *Copper*.) "To the solution of arsenic, add a drop of solution of *subcarbonate* of potassa, and then a drop or two of solution of sulphate of copper. An apple-green precipitate indicates arsenic." (Brande, p. 270.) I add these formulæ, because it has been denied that Scheele's green is ever obtained by using the *subcarbonate of potash*. Pure or caustic potash, it is asserted, is necessary. The quotations now made evidently disprove the correctness of this opinion; but it must be added, at the same time, that a solution of pure potash is best calculated to produce the characteristic appearance.—See Henry, vol. 2. p. 270.

Dr. Bostock has examined this test with considerable attention. He recommends the following proportions: white oxide of arsenic one part, potash three parts, and sulphate of copper five parts, as best calculated to produce the required appearance; and in order to discover the degree of minuteness to which it is capable of being carried, he dissolved one fortieth of a grain of arsenic in sixty grains of water, forming one two-thousand four-hundredth of the whole weight of the fluid; the proportion of potash and sulphate of copper was then added, and the result was, that the green was perfectly obvious.

It deserves mention also, that if the sulphate of copper and potash be added to each other, without the arsenic, a delicate *sky-blue* is produced, instead of the *grass-green* precipitate.

In commenting on this test, Dr. Bostock remarks, that we should always view the fluid by reflected, and not by transmitted light, and that when we come to minute experiments, they should be examined by day-light." By the light of a candle," he adds, " it is difficult to distinguish between delicate shades of blue and green; and a weak solution of sulphate of copper, without any addition, when held between the eye and the window, frequently presents a greenish tinge. Coloured fluids *are best seen by placing a sheet of white paper behind the glasses in which they are contained.*"*

The value of this re-agent was very generally acknowledged until the occurrence of a trial for poisoning, in Cornwall, in 1817. The particulars of this case are detailed below.† And it is only necessary to mention here, that a physician, (Dr. Neale,) swore, that on adding the sulphate of copper and potash to a decoction of onions, he found a green precipitate produced, resembling that caused by arsenic in combination with them. Subsequent experiments by other persons have however hardly confirmed his assertion in its full extent, but they have left a degree of uncertainty sufficient to injure its character in a material manner.

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* Edinburgh Med. and Surg. Journal, vol. 5, p. 169.

† *Robert Sawle Donnal*, surgeon, of Falmouth, was tried at Launceston, in Lent assizes, 1817, for poisoning Mrs. Elizabeth Downing, his mother-in-law, and also of Falmouth. It appeared in evidence, that Mrs. Downing had breakfasted and dined at the prisoner's house in October, and returned home very ill, retching and vomiting, with a very violent cramp; and she continued so three or four days after. On the 3d of November, she was prevailed on, after much persuasion, to drink tea with him again. She was then in perfect health, and had just come out of church. Cocoa was provided for her, and whilst drinking part of the second cup, she was taken very sick. She was soon after put to bed, and died about eight o'clock next morning. Mr. Richard Edwards, a physician of Falmouth, was called to visit the deceased on the 3d of November. He found her very drowsy, and her pulse fluttering. The prisoner considered the disease as *cholera morbus*, but in the opinion of Dr. Edwards, cholera morbus would not produce death in less than two or three days. On dissection, the stomach was found inflamed and soft, and its contents, when tested by the sulphate of copper and the ammoniaco-nitrate of silver, gave the characteristic appearance of arsenic. On the part of the prisoner, several physicians deposed that the symptoms stated resembled those of cholera morbus, and also that this disease frequently destroyed the patient in 24 hours. Dr. Neale swore that he had tried the above tests on a decoction of onions, (the deceased had eaten onions on the day when she died,) and found both the green and yellow precipitates which they yield when applied to arsenic.

These were the leading medical facts elicited on the trial, although there was some circumstantial evidence leaning against the prisoner. He was acquitted.—[I have derived this statement principally from English newspapers of the above date.]

Dr. Paris asserts, that from a fair and appropriate series of experiments, he has satisfactorily established, that the above opinion was grounded on an optical fallacy, arising from the *blue* precipitate assuming a *green* colour, in consequence of having been viewed through a yellow medium. As for example, " a few drops of a solution of sub-carbonate of potash were added to the decoction of onions —its colour deepened to a reddish yellow; the sulphate of copper was then applied, when a precipitate fell down, which was deemed to be of a *vivid green* hue; but, on pouring off the supernatant liquid, and transferring the precipitate on white paper, it assumed a blue colour, without the least tinge of green."[*] He adds, that the yellow colour imparted to the liquid by the alkali, will generally take place on adding it to the infusions of vegetable substances.

Mr. Marshall, of London, performed several experiments with the decoction of onions, but the agent applied by him was somewhat different, being the ammoniaco-sulphate of copper. The filtered liquor of the decoction was tested with this salt, and it caused a very slight hue of green; on adding twelve drops more, a permanent *transparent grass-green* colour was produced, but no *cloud* or *precipitate* could be perceived. When an equal quantity of the decoction and distilled water was tested in the same way, the tint of grass-green still occurred, but it was not so strong; and finally, when two drachms of the decoction were diluted with one ounce of distilled water, no visible alteration was induced by the application of the sulphate.[†]

The distinction which Mr. Marshall draws between the onions and arsenic, is, that with the former, the green *colour* only is produced without any *precipitate*, while, with the latter, a very palpable sediment is caused. Unfortunately, however, even this will not answer. " *A very dilute solution of arsenic produces no precipitate with the test*; and again, a decoction of onions, or other mucilaginous vegetable, prevents the production of a precipitate, when it would otherwise have taken place."[‡]

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[*] Paris' Pharmacologia, p. 215. These experiments should all be made on a piece of writing paper, and not in a glass.

[†] Marshall on Arsenic, p. 152. These experiments account for the discrepancy noticed between some trials made in this state in 1818, in consequence of the noted Kesler case. Dr. M'Neven added the sulphate of copper to the *expressed juice* of onions, and immediately the whole turned of a beautiful green. Dr. Low bruised and *macerated* an onion in distilled water, but the addition of the sulphate produced no change in the colour. The one was evidently stronger than the other.

[‡] Edinburgh Med. and Surg. Journal, vol. 13, p. 519. It would seem, by Dr. Porter's experiments, that coffee added to a solution of sulphate of copper and carbonate of potash, *without arsenic*, also produces a green precipitate. (Silliman's Journal, vol. 3, p. 255.) But this is probably owing to the circumstance already

It is evident, that the importance of the test in question is greatly impaired by these circumstances. It should only be used as an adjunct to other and more decisive ones.*

(*d*) A solution of *sulphuretted hydrogen* in water, freshly prepared, is also a very delicate re-agent, and throws down the arsenic in a golden yellow precipitate.† So minute indeed is the operation of this substance, that Mr. Children found it to give a decided yellow colour to an ounce-measure of distilled water, containing only one drop of a saturated solution of arsenious acid, equal to $\frac{8}{100}$ of a grain of the solid acid, or about $\frac{1}{5700}$th of the whole weight of solution.‡ Jaeger states, that he detected the arsenic in the same manner, in a solution which contained the $\frac{1}{1000}$th part of a grain of absolute weight, and in which it bore the proportion to the water of one to 50,000 or 60,000.§

There are, however, some results affecting this test which deserve mention; and one of these is the fact noticed by Mr. Children, that two or three drops of phosphate of soda added to the arsenical solution, prevented the action of the sulphuretted hydrogen.|| Should, therefore, this substance be contained in the fluids of the stomach or intestines, it would necessarily counteract the expected effect.

Another circumstance is indicated by Dr. Bostock, who, however, examined the test in a modified form. He used an *alkaline hydro-sulphuret*, (of potash) in his experiments. Ten drops of a strong solution of the sulphuret were diffused in an ounce of water, and to this, four drops of a saturated arsenical solution were added. Immedi-

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noticed, of viewing it through a glass, and not on a piece of writing-paper—by transmitted, and not by reflected light.—Quarterly Journal of Foreign Medicine and Surgery, vol. 5, p. 307.

* It will greatly tend to determine the nature of the suspected substance, if we *follow up*, as it were, some of the precipitates with other tests, and ascertain whether the characteristic effects are produced. Thus, for example—"Take the arsenite of copper, wash it well, and then add sulphuretted hydrogen water, the colour will change to a brownish red. Ferroprussiate of potash changes it to a blood-red; nitrate of silver converts it to a yellow arsenite of silver. Finally, reduce the precipitate." Ure, Art. ARSENIOUS ACID.

† On this point the following quotations are submitted to the consideration of chemists. "If water saturated with sulphuretted hydrogen be added to a solution of arsenious acid, a golden-yellow *sediment* will fall down." (Henry's Chemistry, vol. 2, p. 270.) "Sulphuretted hydrogen gas and hydro-sulphuretted water, *precipitate* a golden sulphuret of arsenic." (Ure, Art. ARSENIOUS ACID.) "Sulphuretted hydrogen gas and hydro-sulphurated water throw down the arsenious acid in a yellow golden *precipitate*." (Orfila, vol. 1, p. 104.)—Now, on the other hand, Mr. Children observes, "If a current of sulphuretted hydrogen be passed into fluid containing arsenious acid, it will occasion the *appearance of a fine lemon-colour* through the liquid." (Annals, New Series, vol. 1, p. 142.) And Mr. R. Phillips says, "The aqueous solution of sulphuretted hydrogen gas, when added to the aqueous solution of arsenic, produces a yellow-coloured solution, *without any precipitate*." (Annals, New Series, vol. 1, p. 227.) Is this discrepancy as to *precipitate* or *no precipitate*, owing to the minute quantities of each used by the latter chemists?

‡ Annals, New Series, vol. 1, p. 143.

§ Edinburgh Med. and Surg. Journal, vol. 7, p. 65.

|| Annals, New Series, vol. 1, p. 143. A very little dilute (pure) acetic acid, however, immediately produces the yellow colour.

ately, an orange-coloured cream formed itself at the surface of the fluid, which, in the course of twenty-four hours, had nearly subsided, leaving a precipitate of the same colour at the bottom of the glass. Other substances were now added to the solution of the sulphuret, and the effect produced by two of them deserves notice. A drop of sulphuric acid caused the whole to assume a light milky appearance, and after some time, a delicate yellow precipitate rose to the surface of the fluid, and coated the sides of the glass. The same experiment was performed with a saturated solution of tartarized antimony; it required a larger quantity of it to produce the same effect, but by the addition of ten drops, the appearances that presented themselves were very similar to those where the arsenical solution had been employed, as the precipitate rose to the surface and assumed a deep-orange hue. He adds, that as to the first, (the sulphuric acid) a sufficiently clear distinction is afforded by the colour of the substances, as the sulphur preserves its peculiar light yellow, while the arsenic presents a deep shade of orange; but, between the hydro-sulphurets of arsenic and of antimony, there is greater difficulty of discrimination, since the colour of the precipitate, and the mode of its formation, are very similar.* The only variation was, that more of antimony was required to produce the effect, than of arsenic.

These results certainly prove that sulphuretted hydrogen is not a test to be *solely* depended on, but they are also very far from impairing its general value.—We shall hereafter indicate means by which all doubts as to the presence of antimony can be obviated, while the application of tests, presently to be mentioned, to other portions of the suspected substance, will suffice to corroborate the deduction drawn from its effects. Chemists certainly ought never to neglect employing it, since it will detect arsenic under circumstances when the other tests are nugatory or deceitful.†

An aqueous solution of sulphuretted hydrogen gas is, in many respects, the preferable form of applying this test, and it should be preferred to a solution of an hydro-sulphuret, or to passing the gas itself through the suspected substance.‡

(*e*) *The nitrate of silver* was proposed by Mr. Joseph Hume in 1809, as a test, and his directions for applying it are as follow: "Into a clear Florence oil-flask, introduce two or three grains of any powder suspected to be arsenic; add not less than eight ounce measures of either rain or distilled water, and heat this gradually over a lamp, or a clear coal-fire, till the solution begins to boil. Then, while it boils, frequently shake the flask, which may be readily done by wrapping a piece of leather round its neck or putting a glove upon the hand. To the hot solution, add a grain or two of sub-carbonate of potash or soda, agitating the whole to make the mixture uniform. In the next place, pour into an ounce phial or a small wine-glass about two table-spoonfuls of this solution, and present to the mere surface of the fluid, a stick of dry nitrate of silver or lunar caustic. If there be any arsenic present, a beautiful yellow precipitate will instantly appear, which will proceed from the point of contact of the nitrate with the fluid, and settle towards the bottom of the vessel as a flocculent and copious precipitate."[*]

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* Edinburgh Med. and Surg, Journal, vol. 5, p. 167. Orfila observes, that the hydro-sulphurets do not in any manner disturb the solution of arsenious acid, at least until a few drops of nitric or muriatic acid be added to the mixture. In this case, the same golden-yellow precipitate is obtained as from sulphuretted hydrogen. We must be careful not to confound them and the liver of sulphur, which is a hydrogenated sulphuret of potash, and gives in small quantity a white, and in large, a yellow precipitate, but it never acquires the beautiful gold-yellow colour in question.—Orfila, vol. 1, p. 104-105

† See the subsequent table of its effects on mixtures of arsenic with various articles of food or drink.

‡ Wendland, a chemist at Berlin, has recommended the *hydro-sulphuret of ammonia* as superior to the other alkaline hydro-sulphurets. On adding a few drops of nitric acid to its mixture with arsenic, the yellow precipitate falls down.—Marc, p. 90. See, however, Orfila, vol. 1, p. 104.

This is evidently a convenient and striking test, but it is to be regretted that its utility is impaired by many serious objections.[†] It has been attempted from time to time to obviate these, and to render the proof infallible, but not with perfect success. As the progress of improvement with respect to it is curious, and particularly as it behoves every medical jurist thoroughly to understand this subject, I shall state the various modifications in their order.

1. It is evident that cases of poisoning occur more frequently from arsenious acid simply, than from arsenite of potash, (Fowler's solution); and hence the test should be applicable to a solution of the former substance. Now, according to Dr. Marcet, arsenious acid alone will not decompose the nitrate of silver, while it is well known that the pure fixed alkalies produce that effect.[‡] To avoid the confusion which might arise from the latter circumstance, Dr. Marcet suggested the superior advantages that would attend the use of ammonia. *This alkali, when added singly, does not decompose the nitrate of silver.*

The following mode of applying the test, thus modified, has been published by Dr. Roget, as the direction of Dr. Marcet: "Let the fluid suspected to contain arsenic be filtered—let the end of a glass rod. wetted with a solution of pure ammonia, be brought into contact with this fluid, and let a clean rod, similarly wetted with a solution of nitrate of silver, be brought into contact with the mixture. If the minutest quantity of arsenic be present, a precipitate, of a bright yellow colour, will appear at the point of contact, and will readily subside to the bottom of the vessel."[*] This was so efficient as to show the presence of arsenic when the fluid examined contained only the two hundred and fifty thousandth part of a grain.[†]

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[*] Henry's Chemistry, vol. 2, p. 272.

[†] The 60th part of a grain may be recognized in *two ounces of water, by means of this test.*

The arsenite of silver, which is the substance thus produced, is of an orpiment-yellow colour when first formed; but if allowed to stand for some time in an open vessel, it gradually becomes brown, and it has this colour when dry. It is insoluble in water. Before the blow-pipe, the silver is reduced, and the arsenic is totally dissipated.—*Marcet.* Annals, vol. 3, p. 236.

[‡] I mention this on the authority of Marcet and Paris, (see Pharmacol. p. 219) although Orfila states expressly, that the "*nitrate of silver is immediately precipitated by the solution of arsenious acid*, and the precipitate, which is of a yellow colour, grows black on exposure to light." (Orfila, vol. 1, p. 105.) See also the results obtained by the editors of the London Med. Repository, where this test detected arsenious acid, although its quantity, dissolved in twelve drachms of water, did not amount to one sixty-fourth of a grain. Vol. 6, p. 343.

2. A student at Guy's Hospital suggested to Dr. Marcet, that when nitrate of silver is added to a solution containing an alkaline phosphate, a yellow precipitate is thrown down, similar in appearance to arsenite of silver; hence an ambiguity might readily occur in suspected cases, as an alkaline phosphate might be present in the fluids of the stomach. This fact induced Dr. Marcet to examine the subject anew. He found the shades of colour in the two salts not quite alike, yet sufficiently resembling each other, to render the test a dubious one in judicial cases.[‡] Mr. Richard Phillips made several experiments on it, and repeatedly obtained, without any regard as to proportions in either case, precipitates of arsenite and phosphate of silver, resembling each other so perfectly, that it was impracticable to distinguish them.[§]

In order to obviate the difficulty thus discovered, and still to render the test available, Dr. Paris proposes the following method: "Instead of conducting the experiment in glasses, drop the suspected liquor on a piece of white paper, making a broad line with it. Along this line, a stick of lunar caustic is to be slowly drawn, when a streak is produced of a colour resembling that known by the name of *Indian Yellow;* and this is alike obtained by the presence of arsenic and of phosphoric salts—but the one from arsenic is rough, curdy, and flocculent, as if effected by a crayon; that from a phosphate, homogeneous and uniform, resembling a water colour laid smoothly on with a brush. A more important and distinctive peculiarity soon succeeds—for in less than two minutes, the phosphoric yellow fades into a *sad* green, and becomes gradually darker, and ultimately quite black; while, on the other hand, the arsenical yellow remains permanent, or nearly so, for some time, when it becomes brown. In performing this experiment, the sunshine should be avoided, or the transition of the colour will take place too rapidly."[*] Mr. Thomson observes, that this result will be rendered more satisfactory, by brushing the streak lightly over with liquid ammonia immediately after the application of the caustic, when if arsenic be present, a bright queen's yellow is produced, which remains permanent, for nearly an hour; but that when the lunar caustic produces a white-yellow before the arsenic is applied, we may infer the presence of some alkaline phosphate, rather than that of arsenic.[†]

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[*] Medico-Chirurgical Transactions, vol. 2, p. 157, 160. The utility of applying the test in this way is evident, from the fact, that an excess of ammonia re-dissolves the precipitate.

[†] "When the solution contained only the 25,000th part of a grain of arsenic, the precipitate was of a bright yellow. It was still distinctly yellow, when the quantity of arsenic was reduced by dilution to one 50,000th of a grain. When further diluted, the yellowness grew less and less discernible, and the precipitate appeared of a light blue. It retained this colour until its quantity became too minute for observation. A bluish cloud was, however, distinctly visible, when the fluid examined contained only the 250,000th part of a grain of arsenic."—Roget, in Medico-Chirurg. Transactions, vol. 2, p. 160.

[‡] Medico-Chirurg. Transactions, vol. 6, p. 663.

[§] Annals, vol. 8, p. 152. Ditto, New Series, vol. 1, p. 142.

Mr. Hume has, however, formed a triple compound, the *ammoniaco-nitrate of silver*, which obviates two difficulties, and it is therefore a valuable addition to our means of analysis. It avoids the danger of an excess of ammonia, which might re-dissolve the yellow precipitate, and it does not affect in the least the phosphate of soda. The following is the formula for its preparation: "Dissolve ten grains of lunar caustic in ten times its weight of distilled water; to this add, *guttatim*, liquid ammonia, until a precipitate is formed; continue cautiously to add the ammonia, repeatedly agitating the mixture, until the precipitate is nearly re-dissolved." The object of allowing a small portion to remain undissolved, is to guard against an excess of ammonia. Whenever the test is used, the liquid to which it is added ought to be quite cold.[‡]

3. Dr. Paris mentions another objection to the use of the nitrate of silver, which is, that it produces such copious and flocculent precipitates with the muriates, as to overcome every indication which the presence of arsenic would otherwise afford.[§] Dr. Marcet proposes to obviate this difficulty by adding diluted nitric acid to the fluid, and then cautiously apply the nitrate of silver until the precipitate ceases. In this way, the muriate of silver, which is insoluble, immediately resumes its peculiar density and whiteness, while the arsenic, if it be present, will remain in solution, and may be rendered evident by the effusion of ammonia, which will instantly produce the yellow precipitate in its characteristic form.[||] Dr. Paris, however, objects to this, that the yellow precipitate thus produced, is not always permanent, since it is soluble in the nitrate of ammonia formed during the process; and he recommends that we should give the nitrate of silver its full power of precipitation, and then submit the mixed precipitate to a low heat in a glass tube, when the arsenious acid will be immediately separated by sublimation. He recommends this process also in cases where animal and vegetable substances, as milk, broth, or wine, are mixed with the suspected fluid.[¶] Of this, however, I shall speak hereafter.

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[*] Annals, vol. 10, p. 60.

[†] Paris' Pharmacologia, p. 213. London Med. Repository, vol. 8, p. 178.

[‡] Paris' Pharmacologia, p. 214. Marshall, p. 99.

[§] Mr. Sylvester was, I believe, the author of this objection.—See his paper on the detection of metallic poisons, copied from Nicholson, in the Eclectic Repertory, vol. 4, p. 450.

[||] Marcet in Medico-Chirurg. Transactions, vol. 3, p. 346.

[¶] Paris' Pharmacologia, p. 214.

4. The last objection to the correctness of this test has been already noticed, as occurring on a trial for poisoning. A decoction of onions, however, when treated with the ammoniaco-nitrate of silver, presents *no precipitate*, and the colour, which at first is a reddish yellow, gradually changes to a deep red.[*] But the same objections which I mentioned when noticing the ammoniaco-sulphate of copper, are also urged against the infallibility of this result.[†]

I am apprehensive that all these objections go far to weaken the value of the test under notice. But I would, notwithstanding, always have it applied in the form of ammoniaco-nitrate of silver, and principally for this reason, that it will furnish us with a copious precipitate, ready for any further experiments that we may require to perform.[‡]

These are the tests that have attracted most attention. Others, however, have been lately proposed, which it is proper briefly to mention.

(*f*) *Iodine* is recommended by Brugnatelli to be applied in the following manner: "Take a little recent wheat-starch, add to it a sufficient quantity of iodine to give it a blue colour; mix a little of this blue matter with water, so as to have a blue-coloured liquid. If into this liquid a few drops of an aqueous solution of arsenious acid be put, the blue colour is immediately changed to a reddish-brown, and is gradually dissipated entirely. If a few drops of sulphuric acid be now added, the blue colour is again restored."[§] This is said to have failed in the hands of succeeding experimenters.[||]

(*g*) It has lately been suggested by Mr. Smithson, that the fusion of arsenic, or any of its compounds, with *nitrate of potash*, will give us a result, (arseniate of potash) that is well calculated to detect the most minute portions of poison. On the addition of nitrate of silver, the brick-red precipitate is formed in a very large proportionable quantity.[¶]

(*h*) *The chromate of potash.* This substance has been highly recommended by Dr. Thomas Cooper, as a test of arsenic. His direction is, to add a few drops of it to the filtered solution, or to a grain of white arsenic in substance, and in about half an hour a bright grass-green colour will be produced. The rationale of this experiment is, that the arsenious acid attracts oxygen from the chromic acid, which is thus converted into a green oxyd and precipitates, while the alkali unites with the arsenic acid. By this means, Dr. Cooper says that a twentieth part of a grain, whether in powder or solution, can be detected.*

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[*] Marshall, p. 150.

[†] It is to be regretted, that the reviewer in the Edinburgh Med. and Surg. Journal has not favoured us with the experiments on which he founded these statements. I venture, however, from the ability displayed in this work on subjects relating to medical jurisprudence, to place implicit reliance on its assertions. It is another question, whether, in judicial investigations, we should attach much importance to the fact under consideration. The judge, on the trial of *Donnal*, very justly remarked, "*that the onion liquor was always thrown away, and the vegetable itself only used.*" And the emetic and cathartic effects of a poison would certainly remove all marks of their presence, even if they had been eaten.

[‡] Professor Dana, of Dartmouth college, has recommended a mode of applying this test, which deserves mention. Pour a few drops of nitric acid over the suspected substance; evaporate to dryness by a gentle heat—repeat this, and the arsenic will be converted into arsenic acid. If the substance has previously given a *yellow* precipitate with Marcet's test, and now on dissolving the arsenic acid gives a *brick-red* with it, we have certainly a strong testimony as it respects the nature of the mineral.—New-England Journal, vol. 6, p. 135.

[§] Annals, vol. 10, p. 151,

[||] London Med. Repository, vol. 8, p. 160.

[¶] Annals, New Series, vol. 4, p. 127.

It is remarkable, that while Dr. Cooper was offering this as a test, Dr. Porter, a graduate of Yale College, without a knowledge of his publication, should have obtained results with it, that apparently invalidate several of those already stated.

When the chromate was substituted for arsenic in the production of Scheele's green, a precipitate was thrown down which was not to be distinguished by the eye from the latter substance.

When Marcet's test was applied to a solution of chromate of potash, a yellow precipitate was produced, which, " when placed side by side with one produced by arsenic, could not be distinguished by their colour and appearance."†

Dr. Cooper has objected to the correctness of most of these results, and among other things remarks, that, with Marcet's test, a brown tinge of chromate of silver will be produced.

I am, however, far from considering the results of D. Porter as of great importance, and adopt on this point the words of Dr. Cooper, " As to the preparations of chrome, they are so very unlikely to occasion mischief, either by accident or design, that they may be considered quite out of the question" in our investigations on suspected substances.‡

Further experiments are, notwithstanding, requisite, to determine the value of this salt as a test of arsenic; and I would suggest, whether there may not be other acids, which, like the arsenious, possess the power of deoxidating the chromic acid.

The following directions require attention in all our experiments with tests. 1. In every experiment with an unknown substance, a corresponding one should be made on ingredients of a known composition. If, for example, the operator is about using the copper or the silver test, he should first apply it to a solution prepared by himself, and known to contain arsenic. He will thus become familiar with the expected results. 2. Never commence the experiments until the tests, and all the necessary apparatus, are in readiness, and in a perfect state.§ 3. If the experiments are performed in glasses, examine them by day-light, and view them by reflected, and not by transmitted light. A piece of paper should also be placed behind the glasses. 4. It will be proper to repeat the experiments on white paper, as suggested by Dr. Paris; or, what is better, " take a pane of glass, put a few drops of the clear liquid in the middle, and draw lines out from it in different directions. To one of these, a particle of weak ammoniacal water being applied, the weak nitrate of silver may then be brushed over it with a hair pencil. By placing the glass in different lights, either over white paper, or obliquely before the eye, the slightest change of tint will be perceived." The sulphuretted hydrogen may be applied to another filament of the drop, and so on with all the tests. This is the mode practised by Dr. Wollaston, in general chemical research, and it is admirably adapted for detecting small quantities of a substance.*

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* Cooper's Tracts, p. 444. Silliman's Journal, vol. 4, p. 159.

† Silliman, vol. 3, p. 354. Prof. Silliman seems to sanction the correctness of these experiments.

‡ Silliman, vol. 4, p. 159.

§ Bostock, Edinburgh Med. and Surg. Journal, vol. 4, p. 174.

Of the second class, or the reduction of the white oxide to a metallic state, the following must be mentioned.

(*a*) *Its reduction with the black flux*. Take any of the precipitates produced by either of the foregoing tests, and evaporate it to dryness with a gentle heat, or take the suspected powder, if it has been found in a solid state, and "mix a portion with three times its weight of *black flux*, (consisting of finely-powdered charcoal one part, and dry carbonate of potash two parts,) put the mixture into a thin glass tube hermetically closed at one end, about eight inches in length, and one-fourth of an inch in diameter. Should any of the powder adhere to the sides of the tube, it must be carefully brushed off with a feather, so that the inner surface of its upper part may be perfectly clean and dry. The closed end of the tube, by way of security, may be thinly coated with a mixture of pipe-clay and sand, but this operation is not absolutely necessary, and the open extremity is to be loosely plugged with a piece of paper."† The coated end is now to be heated on a chaffing-dish of red-hot coals, or, it may be heated red-hot in the flame of a spirit-lamp, or we may urge it with the blowpipe until it comes to that state. In either case, if arsenic be present, it will sublime, and form a brilliant metallic crust, resembling steel, and lining the upper part of the tube.

This mode of proving the presence of arsenic, is undoubtedly most decisive and satisfactory, and it is therefore of great importance that no imperfection should attend it.

In the first place, it should never be attempted on a suspected substance, unless the operator has previously performed repeatedly on what he knows to be arsenic. He should be familiar with the appearance of this metal in very minute quantities. Dr. Paris observes, that, to his knowledge, it has happened to a medical person, by no means deficient in chemical address, to ascribe to the presence of arsenic that which was no other than a film of very finely-divided charcoal.‡ This advice, then, WHICH APPLIES TO ALL THE CHEMICAL PROOFS, is emphatically important in the present instance.

2. I should next recommend, when the suspected substance is small, that this experiment be not attempted, until the operator has applied all the tests he intends to use. Let the precipitates then be investigated in this way. The reasons why we should prefer this are, that

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* Ure, art. ARSENIOUS ACID.

† Paris' Pharmacolog. p. 210. Dr. Bostock, however, seems to be of opinion, that the coating of pipe-clay and sand should not be omitted.—Edinburgh Med. and Surg. Journal, vol. 5, p 71.

‡ Paris' Pharmacologia, p. 217.

the tube may break during its heating, and we may lose a part or the whole of the arsenic; while, on the other hand, the bulk of the precipitates will increase the facility of examination. But, above all, I should enforce this direction from the simple fact, that the *reduction of the metal in this way,* is not *alone* a sufficient proof. I put this observation in strong language, that I may be distinctly understood; and I ask those chemists, who of late years have agitated the community with their denunciations against tests, whether they intend that the *steel lustred coating* of metallic arsenic, developed by the above process, is of itself sufficient to prove a criminal guilty? The language used in their writings, would certainly warrant such a deduction. But the truth, I apprehend, is, (and it has not been explained with sufficient explicitness,) that the reduction of the metal is the *confirmatory,* the *decisive* proof; because the previous experiments with tests, have indicated the presence of poison, and they should therefore precede its use.

3. Dr. Bostock remarks, that powdered charcoal added to the arsenic, will answer every purpose required in this process. This, however, is probably incorrect. The presence of potash in the flux would seem to be very essential, since it immediately forms an *arsenite of potash,* and thereby fixes the arsenious acid, and prevents it from being volatilized before the temperature is sufficiently high to enable the charcoal to decompose it.*

4. As to the minuteness of this proof, Dr. Bostock observes, that when less than three-fourths of a grain was employed, the metallic coating was not clearly perceptible; and, from a remark of Dr. Black, he concludes that that chemist considered one grain as the smallest quantity which he thought capable of detection by this process.† Later experimenters, however, assert that they have obtained satisfactory results with smaller quantities. Rose states, that he was able to detect in this way the one-eighth of a grain, mixed with animal matters.‡ And Dr. Gorham, of Harvard University, obtained a distinct metallic film from one-eighth of a grain.§

(*b*) *The garlic smell.—Take a portion of the suspected substance, and place it on red-hot charcoal, or a piece of red-hot iron. It will evaporate with a white smoke, and a peculiar smell resembling garlic.*

This is an uncertain and equivocal test. Phosphorus, zinc, and antimony, under the same circumstances, burn with a similar odour;|| and even if it be arsenic, yet, mixed with either a vegetable or animal substance, the smoke and smell arising from these bodies when heated, will altogether prevent us from detecting the peculiar properties of the

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* Paris' Pharmacolog. p. 211.

† Edin. Med. and Surg. Jour. vol. 5, p. 170. ‡ Ibid. Vol. 7, p. 85.

§ See a valuable and instructive analysis, by Prof. Gorham, of some poisoned sugar, in the New-England Journal, vol. 6, p. 228.

|| Edin. Med. and Surg. Journal, vol. 7, p. 85. Murray's Chemistry, vol. 3, p. 358. Ballard denies that phosphorus emits a similar odour; and observes, that zinc may always be detected by its flocculent oxyd. P. 295.

arsenic. Dr. Bostock mixed equal parts of arsenic and flour, and placed them on iron at a low red heat, but the suffocating smoke arising from the flour could alone be perceived.*

There is also some discrepancy among chemists, as to the condition which is necessary to produce this garlic smell. Dr. Henry remarks, that "this odour is not produced by the white oxide of arsenic when heated, without the addition of some inflammable ingredient." And he adds, "the absence of arsenic must not therefore be inferred, if no smell should be occasioned by laying the white powder on a heated iron."† Murray says, "if, before being evaporated, the oxide is made into a paste with oil, it will, when evaporating, present the peculiar smell resembling that of garlic."‡ Orfila, however, and others, assert that the same will happen if it be thrown upon a plate of copper or iron previously heated to redness, and makes no mention of an inflammable ingredient.§

The reason of this diversity, as well as its proper explanation, appear to have been but lately understood. We have the testimony of two experimenters, that *arsenious acid* possesses no alliaceous smell, and that it is peculiar to the arsenic volatilised in its *metallic state*. If, therefore, the arsenious acid yields this odour, we may infer that its decomposition has taken place, and this is of course facilitated by its projection on red-hot charcoal, or by heating it in contact with bodies which readily unite with its oxygen. Dr. Paris found that the garlic smell only occurred in cases of its projection on copper *in a state of ignition*, but if heated on a plate of copper by a spirit-lamp or blow-pipe, no odour was perceptible; and the arsenious acid was dissipated before the copper could acquire a degree of temperature sufficient to deoxidize it.||

By properly understanding this phænomena, precautions may be taken to prevent its failure. The correct course undoubtedly would be, to take a portion of the reduced metal obtained by process *a*. and project it on red-hot iron. We will thus be furnished with the necessary testimony that is required, if it be arsenic.¶

(c) The tombac alloy.—"*Mix the suspected substance with black flux, as in experiment* a, *and place the mixture between polished plates of copper—bind them tight together by iron wire, and expose them to a low red heat. If the included substance contained arsenic, a silvery white stain will be left on the surface of the copper, which is an alloy of the two metals.*"**

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* Edin. Med. and Surg. Journal, vol. 5, p. 173. Jaeger, however, says he was sensible of the garlic smell of the tenth of a grain mixed with sugar!

† Henry, vol. 2, p. 273. ‡ Murray, vol. 3, p. 357. § Orfila, vol. 1, p. 103.

|| Paris, in Brande's Journal, vol. 6, p. 342. R. Phillips, in Annals, New Series, vol. 2, p. 227. When Dr. Paris employed metals that are oxidizable with difficulty, as gold, silver, or platina, no alliaceous smell could be produced at any temperature.

¶ A remark of Ballard also deserves attention at this time. Many bodies, he observes, may give out either an alliaceous odour, or a dense white smoke, when placed on burning charcoal, but *arsenic alone produces both.*—Ballard, p. 395.

** Copper, whitened in this manner, tarnishes very soon.—Bostock.

Dr. Bostock, in his remarks on this test, gives a preference to charcoal instead of the black flux, but if there be any correctness in the remarks already made, as to the necessity of potash to fix the arsenious acid, this is evidently incorrect.

The following experiment made by him, affects the excellence of the proof under notice. " Two copper disks, of nearly an inch and a half in diameter, scoured bright with sand, had one grain of powdered charcoal, made into a paste with oil, placed between them; they were bound together with an iron wire, and then kept red-hot for ten minutes. When they were withdrawn from the fire, the metal was found to have lost its former appearance, and to have acquired the dull white colour of lead or zinc. The inside of the disks were found to present the same whitish appearance, except on the spot where the charcoal was placed, a small part of which still remained unconsumed. As the disks cooled, the whitish matter which covered them began to separate, and fly off with some force, in the form of small scales, leaving a clear surface of the proper copper colour. In a few minutes, the greatest part of the scales removed, except on the inside near where the charcoal had been placed, and here the disks still retained their grey colour. The charcoal was rubbed off, and the surface below it was found smooth and polished; it had acquired a light colour, resembling that of brass, and near the centre there was a small spot which approached to a steel-grey. This appearance still continued after it had been rubbed with fine sand."

The above description, he observes, of the changes which the disks experience, by being heated with a part of their surface in contact with an inflammable body, impressed him with the idea, that if he had performed this experiment upon a substance which was suspected to contain arsenic, and had not been aware of the appearances that he had to meet with, he would have conceived that he had detected its presence. " Upon repeating the process, in precisely a similar manner, except that one grain of arsenic was added to the charcoal, the oxidation of the copper took place as before, and a small part of the charcoal remained unconsumed; but, upon rubbing it, the white stain was perfectly visible. However, when these disks were compared with those in which the former experiment had been made, the difference between them seemed more in *degree* than in *kind;* so that I should not choose to decide upon the presence of arsenic as indicated by this test, unless the result was more obvious than it must be expected to be, when it exists only in small quantity."[*]

Dr. M'Neven put *oxide of tin* between two plates of bright copper, and surrounded it with a circle of powdered charcoal: the plates were then brought to a red heat, and the consequence was a whitish stain towards the edges of the copper. So also when *calomel* was used; but the whitening was irregular and not so distinct.[†]

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[*] Edin. Med. and Surg. Jour. vol. 5, p. 172.

[†] Journals of the Assembly of the state of New-York, for 1818.

These experiments evidently regulate the value of this mode of proof. It can only be used as an accessary, and, in that case, is valuable. But the operator should perform it at the same time with a substance that he knows to be arsenic, and be well aware of all the peculiarities that attend this particular alloy.

(*d*) *The reduction of the metal by the galvanic pile.* This was suggested by Jaeger, in consequence of the discoveries of Sir Humphrey Davy.* And Orfila has given directions for performing the experiment in his work. The simplest and best mode probably will be, to "let the two wires act on a little of the arsenical solution placed on a piece of window-glass." The negative pole will, if arsenic be present, be coated at the end of twelve, fifteen, or four-and-twenty hours, with a white metallic crust; and if the pole in question be of copper, it will be whitened like tombac. Sometimes even a longer time is required to produce this effect. A pile of fifty pair of plates, of an inch diameter, revives a solution containing only $\frac{1}{60}$ or $\frac{1}{40}$ of solid arsenious acid; but when the quantity of arsenic is extremely small, it is impossible to perceive the revived metal. In that case, by heating the negative wires after the operation, the smell of garlic is perceived.†

After this enumeration of the various modes of detecting the presence of arsenic, it becomes an important question, whether any extraneous difficulties may occur in performing them. The patient is supposed to be dead; his body has been opened, and the appearances found on dissection have been duly noticed. The fluid or solid substances, or all contained in the stomach, have been collected.

With respect to the *solid substances*, our course is evidently plain, according to the directions already given. They should be washed in distilled water, then boiled in a proper proportion of it, according to the directions mentioned when speaking of the solubility of arsenic—portions of this fluid must then be tested by the ammoniaco-sulphate of copper, the ammoniaco-nitrate of silver, and sulphuretted hydrogen—the precipitates are next to be evaporated to dryness, then reduced with the black flux: a portion of this metal is thrown on red-hot iron, and another portion placed between two copper-plates and heated.

But as to *fluids*, we shall experience greater difficulty. They are often mixed with animal or vegetable substances in the stomach; the matter vomited, which may be all that we can operate on, may be in the same combination, and the question then arises, will not these foreign substances alter the results expected from tests, and if so, how are we to obviate this?

To the first, we have to answer, that undoubtedly a great variety has been observed from the mixture of animal or vegetable substances. The example of a decoction of *onions*, already noticed, is a striking proof of this. Again, *muriate of soda* is usually present in the fluids of the stomach, and this has been found materially to obstruct the operation of one of the tests, viz. the nitrate of silver. In such a case, the experiment with it and the ammonia should be repeated several times. At first, if the muriate be present, a white curdy precipitate will only be formed; but, at the second or third immersion of the nitrate rod, a central spot of yellow will be perceived, surrounded by the white muriate of silver. At the next immersion, this yellow cloud on the surface will become very conspicuous.* Orfila has diligently investigated this point, and ascertained the effect of various substances on arsenic, and the appearances developed by the application of tests to these compounds. I have thrown this in a tabular form, and it will be seen that all are more or less affected, except sulphuretted hydrogen.†

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* Edin. Med. and Surg. Jour. vol. 7, p. 85.

† Orfila, vol. 1, p. 108. Ure's Dictionary, art. ARSENIOUS ACID.

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* Ure, art. ARSENIOUS ACID.

† Dr. Ure, in his Chemical Dictionary, mentions that Mr. Thomson, in his London Dispensatory, has given a tabular extract of these results. I have not been able to procure this work, but the present table is probably precisely similar.

Dr. Christison, Professor of Medical Jurisprudence in the University of Edinburgh, has published, in the Edinburgh Medical Journal for July, 1824, a very erudite paper, on the detection of minute quantities of arsenic in mixed fluids, and has scrutinized all that has been said on the subject with great minuteness. The paper is so closely reasoned, that it cannot be easily abridged; but when we find Dr. Christison asserting, that "the more compound mixtures in daily use, as articles of food or drink, affect the precipitates so much as to render the liquid tests absolutely useless;" and "that the very same precipitates are often produced in these composite fluids, whether arsenic be present or not;" and again, "that some of the tests will indicate arsenic where none exists, while others will fail to detect it where it does exist; nay, that a person who follows faithfully one of the processes recommended, may in some circumstances fail altogether to discover the poison, where it is, nevertheless, present in considerable quantity;" a practitioner would be certainly culpable in giving such evidence as might bring a panel's life into danger, without minutely weighing these objections of Dr. Christison, and without repeating the experiments upon which they are founded.

Dr. Christison prefers the test of metallic reduction, after producing a precipitate by means of sulphuretted hydrogen gas, as he thinks he has proved that neither of the tests proposed by Mr. Hume, of Longacre, viz. the ammoniacal sulphate of copper, nor the ammoniacal nitrate of silver, "is of any use in the greater number of vegetable and animal fluids," p. 78—because they precipitate so much animal or vegetable matter with the arsenic.

"Medico-legal authors," says Dr. C. "have recently manifested a propensity to under-rate the force of evidence derived from the reduction of arsenic." Dr. Smith, in particular, p. 104, says, 'Perhaps all that the majority of medical practitioners could swear to, would be, that some metallic substance was incrusted on the glass.' Dr. Christison thinks it almost impossible to mistake in this case, as mercury sublimes in sparse white globules—zinc requires a full white heat to sublime it—tellurium, potassium, and cadmium, besides being very different in appearance, are of too rare occurrence to enter into our consideration; and antimony and bismuth cannot be sublimed by the process for reducing arsenic.—EDITOR.

Effects of Tests on various Mixtures of Arsenic with Animal and Vegetable Substances.

Substances employed.	Strong decoction of tea and arsenious acid, equal parts.	Decoction of coffee and arsenious acid, equal parts.	Wine ten parts, arsenious acid one part.	Wine ten parts, arsenious acid seven parts.	Albumen and arsenious acid.	Gelatine and arsenious acid.	Broth and arsenious acid.	Bile and arsenious acid.	Milk 10 parts, arsenious acid one part.	Milk ten parts, arsenious acid 2 or 8 parts.	Fluid in the stomach of a rabbit poisoned with three grains.
Effect of the substances on each other.	No effect.	No effect.	Preserved transparency.		No effect.	No effect.	No change.	No change.			
Tests. Nitrate of Silver.	Yellowish white precipitate immediately black.	Deep Yellow precipitate.	White.	White, *slowly*.	White.	White.	White.	Same as arsenious acid alone	No visible change.	White.	White.
Lime-Water.	Yellow precip. rather dirty.	Yellow precip.			Same as arsenious acid alone	Same as arsenious acid alone	Same as arsenious acid alone	Same as arsenious acid alone			Greyish white.
Sulphate of ammoniacal copper.	No disturbance, change to a reddish violet.	Nearly green precipitate.	Dark blue.	Green.	Same as arsenious acid alone.	Same as arsenious acid alone.	Colour dirty green, no prec.	Same as arsenious acid alone.	Tinge slightly green.	Green.	Green.
Sulphuretted hydrogen.	Yellow precip.	Golden Yellow.	Deep yellow.	Golden yellow.	Same as arsenious acid alone	Same as arsenious acid alone	Same as arsenious acid alone	Same as arsenious acid alone	Pale yellow	Golden yellow.	Deep yellow.

I think that the reader will like to see Mr. Thomson's Table, which is much fuller than Dr. Beck's, and therefore I have inserted it entire.—Editor.

Mr. A. T. THOMSON'S COMPARATIVE TABLE of the Precipitates obtained from Solutions of White Arsenic, of Oxymuriate of Mercury, of Tartarized Antimony, and of Muriate of Barytes, with different Tests.

1st. Test.—WATER SATURATED WITH SULPHURETTED HYDROGEN GAS.

Solvents.	Precipitates from Solutions of Arsenic.	Precipitates from Solutions of Corrosive Sublimate.	Precipitates from Solutions of Tartar Emetic.	Precipitates from Solutions of Muriate of Barytes.
Water - - - -	Bright golden yellow, which was deepened by the addition of a few drops of strong acetic acid.[1]	Yellow at the instant of its formation, but soon becoming blackish. On shaking the tube it changes to a dirty white.	Orange, curdy, partly suspended, partly thrown down. Ultimately bright orange.	Heavy, and of a dirty, dark brown colour.
Broth - - - -	Scarcely any at first, but on adding a few drops of strong acetic acid a pale yellow.	Whitish yellow at first, quickly changing to mixed cloats of yellow, black and white.	Pale orange at first, soon changing to a deeper bright orange.	Dirty pale brown, heavy.
Milk - - - - -	Little change, but on the addition of a drop of strong acetic acid, a straw-coloured precipitate.	Light ochre, requiring for its formation a large quantity of the test.	Golden yellow, with a shade of orange.	Dirty nankeen, with a shade of brown.
Tea - - - - -	At first, very pale yellow, after some time, a pale greenish yellow. The precipitate was curdy.	Brownish white and yellow, mixed.	Deep orange, curdy, slowly formed: the supernatant fluid yellow.	Dirty light brown, deepening as it fell.
Madeira Wine	Turbid, pale yellow, the colour of the wine destroyed.	Muddy, gradually displaying small floating black flocculi.	Pale orange, long suspended.	The muriate mixed with white wine is milky.—Not tested.
Port ditto - -	Turbid, paler yellow: the precipitate in both is very slowly formed.	Nearly as in the white wines, like clouds through the purple of the wine.	Dark dirty brown.	Pale brown, heavy.
Coffee - - -	A deep golden yellow.	Brownish black.	Deep orange brown.	Not tried.
Gruel - - - -	Pale yellow suspended.	Light brown, slowly formed.	Pale orange.	Not tried.

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[1] This precipitate, dried upon a filter, and heated with some caustic potash in a slender test tube, is decomposed in a few seconds, forming a sulphuret of potash, whilst the arsenic is volatillized in its metallic form, and adheres to the sides of the tube. *(Orfila.)*

II. HYDRO-SULPHURET OF POTASH.

Solvents.	Precipitates from Solutions of ARSENIC.	Precipitates from Solutions of CORROSIVE SUBLIMATE.	Precipitates from Solutions of TARTAR EMETIC.	Precipitates from Solutions of MURIATE of BARYTES.
Water - - - -	White, with the faintish tint of sulphur yellow, when a large quantity of the test was used.[1]	Black, mottled with yellow.	Bright orange.	Deep olive green.
Broth - - - -	Pale, but bright; sulphur yellow.	Clotted heavy, black, mottled with gray	Dull orange, heavy.	Lt brown, partially suspended
Milk - - - - -	Bright golden yellow.	Black clotted.	Orange.	Brown, greenish when the mixture was shaken.
Tea - - - - -	A beautiful yellow,	Brownish black.	Reddish orange, flocculent.	Not tried.
Coffee - - - -	A deep golden yellow.[2]	Nearly black.	Deep brownish orange.	Not tried.
Madeira Wine	Sulphur yellow.	Dirty white, or slate colour.	Beautiful bright orange.	Vide 1st. Tab
Port ditto - -	Fawn colour.	Slate colour, with violet supernatant liquor.[3]	Dark brown, with a tinge of orange.	Violet, heavy.
Gruel - - - -	Bright queen's yellow.	Black dense clots.[4]	Orange-clotted.	Dusky yellowish green.

III. SOLUTION OF SULPHATE OF COPPER, with the addition of Ammonia in excess.

Water - - - -	Beautiful grass green. It completely disappeared on the addition of a few drops of strong acetic acid.[5]	White. thick and heavy.	Pale, whitish blue, very little thrown down.	Copious whitish blue.
Broth - - - -	Beautiful pale green, suspended.[6]	White, curdy, partly suspended, partly thrown down.	Pale whitish blue, with a tint of green.	Opaque, glaucous.
Milk - - - - -	Pale greyish green.	Blueish white, curdy.	Whitish blue.	Curdy white, with a tinge of blue.
Tea - - - - -	Obscure olive, but scarcely a precipitate.	Dirty yellowish white, curdy.	Muddy pale blueish green.	Greyish, heavy, supernatant fluid, yellowish green.
Coffee - - - -	Dark grass green.	Dirty white.	Dirty blueish green.	Not tried.
Madeira Wine	Greyish, with a slight tinge of green.	Heavy clotted white, with a tint of green.	Ærugenous blue.	Vide 1st. Table.
Port ditto - -	Clotted, heavy, dark greenish grey.	Heavy, clotted, blueish grey.	Heavy, dirty slate blue.	Dirty violaceous grey.
Gruel - - - -	Beautiful grass green.	Pale blueish white.	Pale blueish green.	Pale blueish green.

IV. NITRATE OF SILVER; a drop or two of Ammonia being previously added to the Solutions.				
Solvents.	Precipitates from Solutions of ARSENIC.	Precipitates from Solutions of CORROSIVE SUBLIMATE.	Precipitates from Solutions of TARTAR EMETIC.	Precipitates from Solutions of MURIATE of BARYTES.
Water - -	Copious bright sulphur yellow, falling in flocculi from the point of contact.[7]	Dull yellowish white, clotted, changing to dirty white.	Pale brown.	White, heavy; soon blackening.
Broth - -	White, (owing to the muriate of soda) but yellow when treated with nitric acid.	White, copious.	Brownish, mixed with much muriate of silver.	White, dense, curdy.
Milk - -	White, with a tint of yellow.	Dirty white.	Very pale, scarcely visible brown	Not tried.
Tea - -	Yellowish white, which soon blackens.	Dirty white.	Dirty brown.	Not tried.
Coffee -	Yellow, remaining unchanged.	White, changing to black.	Not tried.	Not tried.
Madeira wine	Pale sulphur yellow.	Dirty white, changing to black.	White.	Vide 1st Table.
Port ditto -	White, becoming brown on exposure to the light.	Ibid.	Dirty white.	Heavy, dirty white.
Gruel - -	Yellowish.	Dense, dirty white clots.	Not tried.	Dense, clotted, white.

[1] The hydrosulphuret, added to a solution of the phosphates, throws down a greenish yellow precipitate, the supernatant fluid being yellow and turbid.

[2] Lime-water, also, added to coffee containing arsenic, throws down a yellow precipitate, although it precipitates the watery solution of arsenic white. *(Orfila.)*

[3] Corrosive sublimate cannot be exhibited in port wine with an intention to commit murder, (except by a self-murderer,) as it changes the colour of the wine to pale violet.

[4] All the precipitates by the sulphuret, when dried, and heated in a tube with iron filings, afford metallic mercury, which is volatilized, and shews itself in globules upon the sides of the tube.

[5] This test is capable of detecting arsenic in a solution containing $\frac{1}{110000}$ of its weight. *(Orfila.)*

[6] It has been suggested, that onions boiled in broth, or eaten so as to impregnate with their peculiar qualities the contents of the stomach, might produce the same effects on sulphate of copper, as if arsenic were present; but although a green colour is produced, yet no precipitate falls as when arsenic is present.

[7] A similar precipitate is formed by nitrate of silver, in a solution of any of the phosphates; but the fact of the precipitate being occasioned by arsenic, is easily ascertained by testing a fresh portion of the solution with lime-water. If it contain arsenic, a copious white precipitate will be thrown down; if a phosphate only, there is scarcely any change, or at the most a translucent flocculent precipitate, which remains long suspended. A new method of employing this test was suggested by Dr. Paris. It is, to put upon a piece of clean white paper a broad streak of the suspected fluid, and then run lightly over it a stick of lunar caustic. This is an excellent test, when modified as I have elsewhere (*London Med. Repository*, vol. viii, p. 178) suggested, by brushing the streak lightly over with liquid ammonia, immediately after the application of the caustic. If arsenic be present, a bright queen's yellow is instantly produced, which remains permanent for nearly an hour; but, when the lunar caustic produces a bright yellow before the ammonia is applied, we may suspect the presence of some phosphate rather than arsenic.

If then the fluid be much disguised with animal or vegetable substances, it is better, first of all, to evaporate to dryness, and by a few drops of nitric acid to dissipate the organic product. The remainder can now be dissolved in distilled water, and will present a clear liquid.* A portion also, after it is thus evaporated, may be exposed to heat in a glass tube. The whole range of experiments may thus be applied—or, as has lately been suggested by Orfila, a sufficient quantity of liquid chlorine may be added to the suspected fluid. This will remove the colouring matter of various substances, such as wine, coffee, &c. and a reddish yellow matter will form and gradually be deposited; the whole supernatant fluid, on being filtered, will present the same results, on the application of the various tests, as the aqueous solution does.†

I should not be doing justice to the student in medical jurisprudence, were I to dismiss the subject at this place. There remains a question of magnitude to be discussed, which is, *the degree of proof necessary to determine the fact that poison has been administered?* The chemist will reply, that the reduction of the metal is the only certain and decisive evidence. I answer, it is the HIGHEST POSSIBLE proof, but it cannot always be obtained. Are we then, in all cases of indictment, to acquit the prisoner, because this has not been accomplished? This would certainly seem to be the bearing of some late observations, but I cannot persuade myself of its justice, nor of its conformity to the rules of criminal evidence.

The proofs of the administration of poison are threefold: the symptoms—the appearances on dissection, and the results obtained by chemical experiments. The first are undoubtedly equivocal; they often accompany other diseases in a greater or less degree, and again they vary materially in individual cases. Hence the inference derived from them can only be partial, and must be supported by further proof.

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* Ure *ut antea.* "Should the arsenic be combined with *oil*, the mixture ought to be boiled with water, and the oil then separated by the capillary action of wick threads. If with resinous substances, these may be removed by oil of turpentine. Both tea and coffee should be freed from their tannin by gelatine, which does not act on the arsenic, previous to the use of re-agents for the poison."—Ibid.

† Quarterly Journal, For. Med. and Surg. vol. 3, p. 246. London Med. Repository, vol. 11, p. 336. In a previous volume of the latter work is contained, a memoir by Orfila, in which he announces a new mode of detecting arsenic when combined with animal substances. The author of it is Mr. Rapp. It appears, that in his experiments he was not able to cause the destruction of the animal matters by the nitric acid. He therefore suggests the following:—A given quantity of *pure nitrate of potash* is to be introduced into a glass-vessel with a large neck, and the vessel placed in a sand-bath; this matter is to be heated to a beginning redness, and small pieces of the suspected matter, being evaporated to dryness by a gentle heat, are then to be mixed with it. By these means, both the animal matter and the nitrate of potash become decomposed, and the arsenious acid is transformed into arsenic acid, which unites with the potash of the nitrate, and thus becomes arseniate of potash. As soon as the mass ceases to detonate, it is to be dissolved in water, and the excess of potash is to be saturated with nitric acid. The liquor thus obtained, is to be treated with the tests of the arseniates. (London Med. Repository, vol. 9, p. 514; vol. 10, p. 151.) The safest mode after all, however, is to collect the precipitates first obtained with the ordinary tests, evaporate them to dryness, and then reduce with the black flux.

So also with morbid appearances. We have already shown, in a previous page, what difficulties envelope this point. I do not desire to conceal either of these, but, notwithstanding, wish to contend, that there may be cases, in which the MEDICAL JURIST, (not the *chemist)* would be justified in pronouncing that poison had been the cause of death. The following will illustrate my views.

A family residing in the parish of Keig, in Scotland, and consisting of two brothers and two sisters, were taken ill on the morning of the 19th August, 1821, shortly after eating breakfast. They were all previously in good health, and the dish of which they ate was porridge, consisting of milk, salt, and meal. William Mitchell, one of the brothers, partook largely; but James, who perceived a sickening taste, took less than common, while the sisters had their usual quantity. They were all seized with vomiting, burning heat in the stomach, weakness and fainting, which continued for a considerable length of time, and William finally sunk after seven days, in the manner already described in a former page.* The others gradually recovered, but great debility remained for some months. On dissection, the stomach and intestines presented unequivocal marks of inflammation.†

No part of the salt and milk used that morning was to be found, but the remainder of the meal, and also the contents of William Mitchell's stomach and duodenum, were examined by several physicians and surgeons. No poisonous ingredient, however, could be detected.

In this instance, a family in good health was simultaneously attacked with symptoms that indicated a *common cause,* and there was no epidemic prevalent that would account for them. So violent, too, did the cause in question prove, that the individual who had partaken most largely, sunk under its effects. Under these circumstances, the brother-in-law of the deceased was tried, and the medical witnesses did not hesitate to give it as their opinion, that poison had been administered to his relatives. He afterwards confessed his guilt, and stated, that he had perpetrated the crime by means of arsenic put among the salt, on the morning when the Mitchells were taken ill.

But it may be asserted, that the frequent vomitings, and the length of time which elapsed previous to death, prevented the detection of the poison. How then did it happen, that, in Dr. Roget's case, no proof of arsenic could be found in the fluids vomited? "When arsenic has been taken in substance," says Mr. Brodie, "small particles are frequently found entangled in the mucus, or extravasated blood; but where this is not the case, I have never known, in an animal capable of vomiting, that arsenic could be detected in the contents of the stomach after death, though examined by the most accurate chemical tests; and Mr. Brande could detect none in the urine."—Orfila remarks, that "he has satisfied himself, that all animals which have taken this poison dissolved in water, and had abundant vomitings before death, do not exhibit the least trace of arsenic, when the contents of the stomach are submitted to chemical analysis."[*]

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* See page 385. Case by Mr. Murray.

† Cases of Poisoning, by Mr. Murray. Edinburgh Med. and Surg. Journal, vol. 18, p. 167.

In such cases, then, we should examine the matter passed by vomiting or by stool, if they can be obtained. It is even directed to take the stomach itself, cut in pieces, and dissolve it in nitric acid. The fluid thus obtained is to be filtered, and tested by the means already proposed.[†] But if no evidence is obtained by either of the modes, we can only rely on the remaining facts that are presented to us. And it must be strongly impressed on the mind of the medical witness, that in an instance of this nature, his opinions should be founded on a strong combination of circumstances, a marked peculiarity of symptoms, and a striking disorganization of parts.

I shall conclude this discussion with a narrative of some cases that have come before criminal courts. These form a commentary on the general directions, and illustrate the difficulties that medical witnesses have to encounter.

The case of Miss Blandy. This is peculiarly interesting, as it gives us the mode pursued to detect arsenic some seventy years since.

Mary Blandy was tried in Feb. 1752, at Oxford, for poisoning her father with arsenic. It appears that she fell in love with a Capt. Cranstoun, and that her father was averse to her marriage with him. The wretch then seems to have formed the plan of destroying him, in order to obtain possession both of his daughter and his property, and for this purpose forwarded arsenic to Miss Blandy, which she was induced from time to time to mix in his food and drink. It produced prickings and heat in his tongue and throat, and burning and pains in his stomach and bowels, which went off with vomitings and purgings. His health sunk under this dreadful regimen, and, in particular, he observed that his teeth decayed very rapidly. Several females who had accidentally taken of the tea in which the poison was mixed, were also seized with vomitings and purgings, and suffered greatly. At last, on the 6th of August, she appears to have added a larger quantity than usual to his water-gruel. He was attacked with all his former symptoms, but with double violence; the abdomen swelled, and there was excessive pain and prickings over every part of his body. On the 10th, Dr. Anthony Addington visited him, and found his tongue swelled, his throat slightly inflamed and excoriated, his eyes inflamed, his pulse low, trembling and intermitting, and his respiration difficult. There was also an inability to swallow even the smallest quantity. The patient stated that he had had several bloody stools. During the next two days, he appeared somewhat relieved, except that the rectum was ulcerated and painful; but on Tuesday, (13th) a slight delirium, with a short cough, and ulcerous discharges from the rectum supervened, and death ensued on Wednesday.

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[*] Orfila, vol. 1, p. 140.

[†] Orfila, vol. 1, p. 184. Gordon, p. 31. It is a most interesting question, and richly deserving of examination, whether the poison can be absorbed, so as to obtain traces in the manner now described. I copy the following from a late journal. "In order to ascertain whether or not the serous effusion which commonly occurs in the pleura of animals poisoned by arsenic, arises from the absorption of this mineral, M. Laissaigne, of Alfort, submitted the mediastinum of a horse, destroyed by arsenic, to chemical analysis, by which means he detected its presence."—(New-York Medical Repository, vol. 22, p. 111.) And while this work has been passing through the press, I have met with a case where the method above directed was found the only effectual one by which the *poison could be detected in its metallic state*. I have quoted it at length in a subsequent page.

On Thursday, the body was examined. "The back and hinder part of his arms, thighs, and legs, were livid. The heart was variegated with purple spots. The lungs resembled bladders half filled with air, and blotted in some places with pale, but in most with black ink. The liver and spleen were much discoloured; the former looked as if it had been boiled, but that part of it which covered the stomach, was particularly dark. The kidneys were stained with livid spots. The stomach and bowels were inflated, and appeared, before any incision was made into them, as if they had been pinched, and extravasated blood had stagnated between their membranes. They contained nothing but a slimy, bloody froth. Their coats were remarkably smooth, thin, and flabby. The wrinkles of the stomach were totally obliterated. The internal coat of the stomach and duodenum, especially about the orifice of the former, was prodigiously inflamed and excoriated. There was no schirrus in any gland of the abdomen, no adhesion of the lungs, nor indeed the least trace of a natural decay in any part whatever."

A portion of the powder found at the bottom of the gruel administered to Mr. Blandy, was handed to Dr. Addington. He gave a part of this to Mr. King, a chemist in Reading, who examined it; and declared it to be white arsenic. On the remainder he experimented himself, and came to a similar result. The question was asked him, Why do you believe it to be white arsenic? He replied, "For the following reasons:—1. This powder has a milky whiteness; so has white arsenic. 2. This is gritty, and almost insipid; so is white arsenic. 3. Part of it swims on the surface of cold water, like a pale sulphureous film, but the greatest part sinks to the bottom, and remains there undissolved; the same is true of white arsenic. 4. This thrown on red-hot iron, does not flame, but rises entirely in thick white fumes, which have the stench of garlic, and cover cold iron, held just over them, with white flowers; white arsenic does the same. 5. I boiled ten grains of this powder in four ounces of clear water, and then passing the decoction through a filter, divided it into five equal parts, which were put into as many glasses. Into one glass, I poured a few drops of spirits of sal-ammoniac; into another, some of the lixivium of tartar; into the third, some strong spirit of vitriol; into the fourth, some spirit of salt; and into the last, some syrup of violets. The spirit of sal-ammoniac threw down a few particles of pale sediment; the lixivium of tartar gave a white cloud, which hung a little above the middle of the glass; the spirits of vitriol and salt made a considerable precipitation of a lightish coloured substance, which, in the former, hardened into glittering crystals, sticking to the sides and bottom of the glass; syrup of violets produced a beautiful green tincture. Having washed the saucepan, funnel, and glasses used in the foregoing experiments, very clean, and provided a fresh filtre, I boiled ten grains of white arsenic, bought of Mr. Wilcock, druggist, in Reading, in four ounces of clean water, and filtering and dividing it into five equal parts, proceeded with them just as I had done with the former decoction. There was an exact similitude between the experiments made on the two decoctions. They corresponded so nicely on each trial, that I declare I never saw any two things in nature more alike than the decoction made with the powder found in Mr. Blandy's gruel, and that made with white arsenic. From these experiments, and others which I am ready to produce, if desired, I believe that powder to be white arsenic."

Miss Blandy was condemned and executed, denying to the last any knowledge of a noxious quality in the powder she gave to her father.*

The case of Nairn and Ogilvie. Katherine Nairn and Patrick Ogilvie were tried before the high-court of justiciary in Scotland, in August, 1765, for incest and murder. Thomas Ogilvie, the husband of one of the parties, and the brother of the other, appears to have been a man in bad health, subject to cholics and cough. On the day before he died, he was on foot several miles from his house, and told two or three individuals that he was unwell. He arose, however, on the morning of the 6th of June, somewhat better—walked a mile or two, and on his return, took some tea which had been prepared for him by his wife. Shortly after, he was seized with vomiting and purging—complained of great thirst, difficulty of breathing, and pain in the calves of his legs. For about an hour before his death, there was an intermission of the vomiting, but a severe attack then took place, in which he died. This was at night.

Two surgeons and a physician viewed the body *six days* after death. They found the lips, nails, and a part of the breast discoloured, and the tongue swelled beyond its natural size, and cleaving to the roof of the mouth. Dr. Ogilvie thought the body too much putrefied at this time to be opened with safety to the operator; and accordingly no dissection was made. It was inquired of one of the surgeons, whether these appearances might not happen in a bilious cholic; to which he replied, that the swelling of the tongue and discoloration of the lips would not.

It was proved that Patrick Ogilvie had shortly before purchased some arsenic.

Both the accused were convicted. Ogilvie was executed, but Katherine Nairn escaped from prison.†

In this case it may be observed, that a negligence almost criminal seems to have attended the investigation; and this is the more astonishing, as apprehensions were entertained of poisoning several days before the death of Ogilvie. It is certainly very extraordinary that the poisoned tea was not examined, and it is equally so that the body was not inspected immediately after death.

Case of Miss Burns. I have already noticed this as to the proofs of conception,* and will now consider it with reference to the question of poisoning.

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* Hargrave's State Trials, vol. 10. p. 1 to 35. † Ibid. p. 479 to 520.

The symptoms. "About six o'clock on Wednesday, the 23d of March, 1808, this unfortunate female was seen by the servants in her usual state of health. She was next seen by the servants at about a quarter before nine, sitting at breakfast with Mr. Angus, apparently very ill. After breakfast, she was lying on a sofa, still very bad, and complaining of a pain in her bowels. On moving about afterwards, she held by the chair, as if from pain; and about an hour and a half after breakfast, she ordered some water-gruel, of which she drank nearly three quarts in the course of the day. She continued very thirsty, in pain, and sick the whole day, vomiting frequently, and rejecting the gruel almost immediately after taking it. What she vomited, appears to have been of a green colour. On Thursday morning, at six o'clock, she was lying, as she had been left the night before, on the sofa, with pillows under her head. She complained that she was very thirsty—said she was tired of gruel, and got some water posset and a little warmed beer. She also complained that she was badly hurt to make water, but was relieved by sitting on an onion sliced, with some boiling water poured upon it. This morning her vomiting was of a black colour, and she continued sick and vomiting all day, till towards evening, when the sickness went off, and she appeared better, and could stir more about.

On Friday morning, at four, the house-maid went into the room, and thought her much worse, as she breathed quicker than before. She was again seen about six, in much the same state, and lying in the same posture on the sofa. She asked for some warm beer, which remained on her stomach, and she also got about a pint of gruel. She said that the pain had left her. Her vomiting had ceased, but was succeeded by a *lax*, which continued all the morning. A little before ten, the house-maid was sent out for some madeira, Miss Burns having asked for some. Between ten and eleven, the kitchen-maid was in the room, and received orders about dinner. Miss Burns said she would have some barley-water. On the return of the house-maid, about eleven, she went straight into the parlour, and Miss Burns was found lying dead in the corner by the door, with her face against the wall, cowered of a lump, her elbows upon her knees, and one foot *crudled* under her.

During the whole course of her illness, she did not go to bed; but remained in the parlour, generally lying on a sofa. She refused to have medical assistance, but Mr. Angus said he gave her seven drops of laudanum one night, and ten drops another, and on the morning of her death, some castor-oil in spirits, which came up immediately."

Appearances on dissection. Drs. Rutter and Gerard, with Mr. Hay, a surgeon, examined the body on Sunday, two days after her death. "After having removed the body, a small stain of blood was observed on the sheet of the bed on which it had laid, and the pillow was stained with a fluid which had issued from the head. The body being lain on a table, a large quantity of a thin yellowish fluid poured out from the nostrils, and was collected in vessels. No marks of external violence were discovered on the body, nor was there any appearance of commencing putrefaction. The nails of the fingers were of a bluish colour, and the veins on the external surface of the abdomen appeared to be much enlarged. On opening the abdomen, a considerable quantity of fluid was found to have been effused into that cavity, similar in colour and smell to that which issued from the nostrils, but more turbid. Marks of inflammation were found on the external or peritoneal coat of different portions of the small intestines, but the large intestines were free from it. The external coat of a part of the smaller curvature of the stomach was also inflamed; and a similar appearance of inflammation was observed on a small portion of the anterior edge of the liver, directly over the smaller curvature of the stomach. On raising up the stomach, an opening through its coats, of about the size of a crown-piece, was found in the anterior and inferior part of its great curvature; and from this opening, a considerable quantity of a thick fluid, of a dark olive-colour, issued, of which fluid some ounces were collected and preserved. The natural structure of the coats of the stomach, for a considerable space around this opening, was destroyed, and they were so soft, pulpy, and tender, that they tore with the slightest touch. Around this part of the coats of the stomach, there were no traces of inflammation whatever. The stomach was then taken out of the body, and its internal surface was carefully washed, and the contents washed out were preserved. The internal villous coat of the duodenum was slightly inflamed; and a quantity, about three ounces, of a fluid resembling that in the stomach, but not quite so thick, was also taken out of one of the smaller intestines and preserved."

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* See p. 101 of this work.

Chemical examination. The assistance of Dr. Bostock was obtained for this investigation. The fluid taken out of the stomach and intestines, and cavity of the abdomen, as well as that collected from the nostrils, were subjected to various tests by that able chemist, but no proof of the presence of arsenic or mercury could be obtained. And the examiner could not discover in the contents of the stomach, by the smell, the presence of any known deleterious vegetable substance. The fluid contained in the stomach deposited no sediment, nor was any but a mucous sediment found in the water with which the inner surface of the stomach was washed.

The contents of the stomach were examined in the state in which they were found, and also after being filtered, but with equally unsatisfactory results.

In consequence of the circumstances attending the death of Miss Burns, Mr. Angus was indicted for her murder; and, on the trial, Dr. Carson, of Liverpool, appeared as a witness for the prisoner. He objected to the conclusiveness of the proof, both as to symptoms and as to the appearances on dissection.

As to the *symptoms*, he urged that their general mildness showed that she had not been poisoned. This however is merely a gratuitous assertion. Death ensued in this case after an illness of only *fifty hours*—and it certainly requires a full share of hardiness to say that a mild disease would produce this. He also observed, that, from all he had read of mineral poisons, he was led to believe that convulsions have always preceded death. Here he is no less mistaken. Convulsions and delirium, which he afterwards noticed, are both uncommon attendants on the exhibition of this class of poisons.

As to the *appearances on dissection*, he remarked that the bodies of persons killed by poison, run rapidly into putrefaction, and as this did not occur in the present case, so it was a proof in favour of the accused. I have shown in a previous page, from facts quoted in the notice of the trial, and from other sources, that this is a totally incorrect opinion.

The state of the stomach and its erosion, he explained, by referring to Mr. Hunter's paper in the action of the gastric juice. As I have already enlarged on this point, I will not repeat the arguments used; but I may add, that the medical witness for the crown urged against its probability, the fact, that none of the neighbouring viscera were acted upon by this fluid. They also suggested that during the illness of Miss Burns, the large quantity of fluid which she drank, and which was immediately rejected by vomiting, must have carried off the gastric juice nearly as fast as it was secreted, and the quantity of fluid found in her stomach must have so diluted and weakened the gastric juice remaining as to render it unequal to dissolve the stomach itself after death. The injury was not in the lowest and most depending part, but in the anterior part of the large curvature. Lastly, the action of the gastric juice afforded no explanation of the inflammation in the duodenum, small intestines, liver, or fundus uteri.

The *chemical proofs* of poisoning were wanting in this case, but the remark of the witnesses on this is founded in truth. "We are not always (say they) to infer that poison has not been administered, because it could not be detected in the contents of the stomach after death."*

The case of Kesler.† Abraham Kesler was tried at the Schoharie oyer and terminer, in the state of New-York, on the 12th September, 1817, for poisoning his wife. The indictment contained two counts, one for administering white arsenic, and the other for administering laudanum. Judge Yates (now governor of this state) presided.

Symptoms. The prisoner and his wife came to the house of Catherine Best, in the town of Middleburgh, on Sunday evening, the 17th of November 1816. About midnight, the prisoner informed the landlady, that his wife was seized with a violent vomiting and purging, but he refused the assistance that was profferred. In the morning, the deceased said she was easier, but complained of pain in her stomach and head, and was extremely thirsty. During the day, she grew worse, with pains in her head and stomach; she perspired very much, and complained of a burning heat in her breast and stomach. Cold chills also occurred occasionally. On the second morning she appeared better, but still felt pain, and a burning heat in the stomach. Mrs. Best urged the prisoner to send for a physician, which he declined at first, but after repeated requests, at last said he would go for one. It appears that he purchased some medicines, but never desired the physician to visit his wife. Indeed, no medical man saw her until the day before her death. On Tuesday afternoon she was again seized with violent pains and vomiting, and at intervals with cold chills and sweats. The next morning she was better, and attempted to sit up; but a trembling in her limbs and drowziness came on, which forced her to return to bed.

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* Edinburgh Med. and Surg. Journal, vol. 5, p. 220. Bostock's Vindication, &c.

† I had intended to add the case of *Eliza Fenning* in this place, but on referring to it, I find the proofs of poisoning were completely established; so much so, indeed, that the arsenic in powder was picked out of the poisoned dumpling, and a half teaspoonful of it was taken out of the pan in which they had been kneaded. The question which excited so much agitation in England, was, whether *she had been the poisoner?* I have noticed the symptoms in another place.

On Wednesday afternoon, the prisoner said he had given her a vomit—in the evening, all her former symptoms returned with great violence. She said her whole body was in distress and pain, and was alternately cold and hot. Kesler was again urged to go for a physician, which he did, but brought none with him. On Thursday, she was occasionally delirious. Kesler gave her more medicine, upon which she grew still worse. In the evening, Dr. Carpenter saw her, and pronounced her past recovery. On Friday she could not speak, and died on the evening of the same day, (the 22d of November.)

From the evidence of Dr. Carpenter, it appeared that Kesler had called on him several times, and purchased a dose of tartar emetic, two portions of cathartic, and three or four fever-powders, composed of opium, camphor, and tartar-emetic. He also obtained from Dr. C. half an ounce of opium, stating that his wife was in the habit of taking opium, and could not well do without it. This was afterwards proved to be totally false. Her relatives with whom she had resided, (for Kesler enlisted as a soldier immediately after his marriage, and never lived more than four or five months out of five years with his wife) positively swore that they had never known her to take any opium. When Kesler called the second time on the physician, he obtained more opium, alleging that the former had been lost. On the third visit, he purchased a vomit. On Thursday evening, when Dr. C. saw the deceased, she complained of a severe pain in the pit of the stomach, and such soreness about that part, that she could not bear the bed-clothes on her. Her extremities were cold, her pulse was fluttering, intermitting, and very feeble, and her countenance ghastly.

Appearances on dissection. The body was disinterred two months after death, for the purpose of inspection. Putrefaction was far advanced, and the surface of the body was of a dark colour, particularly on the abdomen. The stomach and intestines were in an highly inflamed state, and on opening the former viscus, a small quantity of a very dark-coloured fluid was observed. Small particles, of a vitreous appearance, were also discovered on the inner coat, and some of them had penetrated into it. Finally, opium in considerable quantity was found in the stomach.

The intestines do not appear to have been particularly examined; but it is mentioned that particles of the same nature as those mentioned above, were taken from the smaller ones.

Chemical examination. The particles in question, when crushed with a knife, exhibited a white colour. Some of them were thrown on a heated iron, and a dense white fume arose from their combustion, but the witnesses state that they could not detect any peculiar smell. And they account for this from the fact, that tar was kept burning in the room to destroy the smell from the corpse. Dr. Miller and Dr. White at different times placed a portion of these particles* between polished plates of copper, and after securing them with an iron wire, submitted them to a red heat. In both instances, the interior of the plates towards their edges were whitened in a circular form.

Dr. Miller took home about two tea-spoonfuls of the contents of the stomach, which also contained some of the particles; but indisposition prevented him for some time from performing any experiments on it. When he did so, he diluted the contents of the stomach with a pint of water, and being now colourless, he applied Marcet's test in the manner directed by that chemist. An *orange*-coloured precipitate fell down, and on repeating the same upon a known solution of arsenic, the same precipitate was observed. Dr. Joseph White also performed this experiment at his residence, but the result in question was not obtained, in consequence of the turbid state of the fluid. As opium had been detected in the stomach by the smell and the taste, he took a solution of arsenic, and added to it some of the tincture of opium. Marcet's test was then applied, and a precipitate was produced, of the same colour and appearance as that produced on the fluid of the stomach.

Dr. Joseph White also put some of the fluid of the stomach into a phial, containing a solution of the sulphate of copper and subcarbonate of potash. "This mixture," he testifies, "after standing for some time, produced a copious precipitate; that precipitate, however, was darker, and that portion of the fluid above the precipitate was also darker than what takes place in the process for making Scheele's green."

This was the medical testimony. Accessary circumstantial evidence was adduced, and the result of the investigation was a verdict against the prisoner.

Judge Yates transmitted the minutes of the testimony to the executive, (Governor Clinton,) who submitted them to the examination of Dr. M'Neven, professor of chemistry in the New-York School of Medicine. The report of this gentleman, together with a statement from the foreman of the jury, induced the Governor to suspend the execution of Kesler, and to refer the consideration of his case to the legislature, the supreme tribunal, to whom the power of pardoning or punishing would now belong.

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* It must be noticed, that the particles *solely* were placed between the copper. No charcoal was added.

Dr. M'Neven barely notices the deposition of Dr. Carpenter, but remarks on the appearances after death, that the advanced state of putrefaction, and the numerous and various causes of inflammation, render any inferences from them inconclusive. "Any conclusion," he remarks, "to be drawn from the appearance of inflammation in this case, must therefore depend for corroboration altogether on other facts."

As to the chemical tests, he observes, that the dense smoke proved nothing. Other mineral substances, as corrosive sublimate, calomel, tartar-emetic, when placed on a heated iron, gave out a dense white smoke.

As to the experiment with copper-plates, he states that he put oxide of tin (putty of tin) between two plates of bright copper, and surrounded it with a circle of powdered charcoal. The plates were then brought to a strong red heat, and the consequence was a whitish stain towards the edges of the copper. The same experiment was made with calomel, and there appeared an irregular whitening towards the edges, but less distinctly than in the former case. Dr. M'Neven then made a third experiment, with charcoal alone, and having raised the heat pretty high, there was left in the place of the charcoal a pale brass-coloured circumscribed spot, that appeared white in comparison of the red copper-colour round it. Rubbing did not at all lessen this whitish stain. "An experienced eye," he remarks, "would perhaps distinguish all these stains from the whitening of arsenic; but, in a capital case, I would not like to convict on a shade of colour."

To the value of Marcet's test, he objects, that Dr. Miller should have stated whether well-water had been used, as it alone would give a precipitate with nitrate of silver. The colour of the precipitate should have been *yellow* instead of *orange*. And, finally, he urges the fact, that phosphoric acid would produce the yellow precipitate.

As to Scheele's green, its inconclusiveness was shown by the following experiment: "I took the expressed juice of onions, and added to it a solution of sulphate of copper; immediately the whole was turned to a beautiful green, not to be distinguished in appearance from that of Scheele's green."

In his general remarks on the scientific testimony, Dr. M'Neven offers the following opinion: "Some of the results obtained in the experiments of the physicians, are such as arsenic will afford, but not exclusively; nor can any reliance be placed on any one, or all of them, unsupported by others more decisive. I have shown that the same, or some very similar to them, proceed from other and innocent substances. At the same time, the unerring signs of arsenic were not had at all; nor were the most proper means taken to procure them.

"The only thing to be relied on, in the opinion of the best chemists, is *the exhibition of the metal itself in its metallic lustre and state.* The arsenic might next be further identified by putting a small quantity between two polished plates of copper, surrounded by powdered charcoal, and exposing them to a low red heat. If the included substance be arsenic, a white stain will be left on the copper. In this way, every part supports another, and there is no possible ambiguity. But, as those experiments, which are alone certain, were omitted, and no experiment performed with unexceptionable accuracy, I must (he concludes) give it as my opinion, confining it however to the scientific part of the testimony, that the indictment for poisoning with arsenic is not substantiated by the evidence of the witnesses."

The message of the governor, with its accompanying documents, was referred to a committee of the legislature. These gentlemen proposed questions to several physicians summoned before them, (Drs. Low, Stearns, and Bay, and the author of this work,) touching the symptoms, appearances, and tests, and at their request also, experiments were instituted by the late Dr. James Low,* with reference to the difficulties proposed by Dr. M'Neven. The answers to the questions admitted, among other things, that *all* the tests of arsenic had not been used, and that in particular the reduction of the metal, the most important one, had been omitted. But they stated, at the same time, that the experiments, generally, indicated the presence of arsenic. They also mentioned, that although other causes might have produced the symptoms in question, yet they were among the usual effects of arsenic, particularly if, as was highly probable, the exhibition of opium had been interposed between its different administrations. They asserted the improbability of the white particles being the remains of any of the medicines furnished to the prisoner by Dr. Carpenter, and they urged the fact of these particles laying unaltered for two months in the stomach, as a proof that they were of a metallic nature.†

Dr. Low applied Marcet's test to a solution of arsenite of potash and to an infusion of onions. In the one case, the characteristic appearance was produced, but in the other, " there was so slight a variation of colour (if any) that it could not be named, and no precipitate at all." The sulphate of copper was then applied to a solution of white oxide of arsenic and potash, and also to a portion of the infusion of onions. In the former, a bluish-green precipitate appeared; in the latter no obvious green colour was present, and no precipitate.

Five grains of oxide of bismuth, with a circle of charcoal, was next placed between two plates of copper, and the same quantity of corrosive sublimate, tartar-emetic, and arsenic was treated in a similar manner. The eight plates in question were thus submitted to an equal degree of heat. On examination, the bismuth plates exhibited a *slight whitish* spot in the centre of the plates, where the bismuth was in contact. The corrosive sublimate and tartar-emetic ones had the copper hue impaired in different places; and, in some parts, they were permanently a little whitish, but the arsenic plates presented the unequivocal silver-like alloy.[*] "I should have no hesitation," he adds, "in stating, that these experiments, all of which produced changes on the surface of the copper, decide the question as to the appearance of the alloy of copper and arsenic, in which there is, comparatively, a marked difference of aspect from the other three."

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* A graduate of Edinburgh, and while there the private pupil of the late John Murray, M.D. lecturer on chemistry.

† The answer to one question is doubtless incorrect, and must therefore be noticed. It refers to the rapidity with which arsenic will induce vomiting, and asserts that *a full stomach will probably retard the operation, and an empty one accelerate it.* Renault and others assert that the contrary is the fact, and they substantiate it by cases.

The committee of the legislature presented a statement of these answers and experiments to the legislature; but they stated, explicitly, "that they would not, however, direct the execution of the convict upon this testimony alone, and their opinion had been influenced entirely by taking it in connection with the other testimony in the cause." They accordingly brought in an act for the execution of Kesler, which passed both houses of the legislature and the council of revision, (consisting of the governor, chancellor, and judges,) and he suffered the punishment prescribed.[†]

I do not intend to offer many remarks on this case, but I may be permitted to say, that while I deeply regret that the reduction of the metal was not effected, yet the results obtained from the tests used, present to my mind a very strong chain of evidence against the accused. I am acquainted with the fact, that exertions were fruitlessly made to procure the proper apparatus for the reduction, and therefore the inviduous sneers that have appeared concerning the ignorance of the witnesses, might well have been spared. But I will not enter into this controversy. Dr. M'Neven viewed the subject as a chemist. I wish to consider it (so far as the distinction is allowable) as a medical jurist, and I present it to those who are desirous of examination, in the following point of view. What substance is there, that will lay undissolved for two months in the stomach of a diseased person, and on proper trials, will give, in a fluid state, a yellow precipitate[‡] with Marcet's test, and although turbid, will present a dark green with Scheele's? These results must be taken *unitedly*, and not *separately*. It is certainly no answer, that the oxide of tin will produce one, and a decoction of onions the other. In order to render them properly available, it should have been proved that they had been administered during the illness of the female. The probability at present is decidedly against it. Scheele's green also is a sufficient preventive of mistake as to phosphoric salts.

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[*] These plates were afterwards shown to Dr. Joseph White, who stated distinctly, that the appearance found by him perfectly resembled the arsenic plates used by Dr. Low.

[†] In this narrative, I have endeavoured to present a fair and complete abstract of all the leading facts and reasonings adduced by the various individuals concerned, and I trust that it will be so considered. At all events, I feel a consciousness that there is no intentional perversion or omission in any part of it.

[‡] I use this term advisedly. The characteristic appearance of Marcet's test was unquestionably present, and the use of the term *orange* instead of *yellow*, must not lead us to conjecture a mistake on this point. *The test was applied at the same time to a solution of arsenic*, and the resemblance was perfect.

Again, are not the symptoms strongly corroborative? The administration of a substance which produced violent vomiting, after she was convalescing, and the repeated exhibition of this article after its attendant train of consequences, with his falsehood respecting the attendance of a physician, certainly indicate a determination to destroy the health, if not the life, of the individual. What is there in his favour? *Is it to be found in his offers to another female while his wife, was living, or in his wishes that she was out of the land of the living, or in his often repeated determinations that he would never live with her?*[*] And yet this is a man whose condemnation, according to Dr. Thomas Cooper, is " not creditable either to the chemical knowledge of the physicians whose evidence influenced his condemnation, *or to the jurisprudence of the state which directed his execution.*"[†] This is the man, of whose trial he has said, " *no lawyer can find any positive, and no chemist any probable proof of guilt.*"[‡] This is the man on whom he has rung changes in the *Democratic Press*, before the *American Philosophical Society*, and in the *preface and in the appendix of his Tracts on Medical Jurisprudence.* Dr. M'Neven asserted, that the reduction of the metal was alone to be depended on. He said so, and he maintained it manfully. Dr. Cooper came forward as his champion and friend—quotes long extracts from papers familiar to every student in chemistry; and when we were looking for new arguments and new proofs in favour of Dr. M'Neven's assertion, what does he present us with? A new test—a test, which, from its very application, must be productive of uncertainty—a test, which the only experimenter, that has subsequently examined it, finds Protean in its character, and the results concerning which are diametrically opposite to those stated by Dr. Cooper himself.

It is not for me to vindicate the jurisprudence of this state. I have only to point to the men who were at that time members of the council of revision, and who deliberately sanctioned the execution.[§]

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[*] Dr. Cooper, in one of his publications, remarks, that it has not been proved that Kesler had any arsenic in his possession. In elucidation of this, I submit the following extracts from a letter dated May 4, 1823, which I received from Henry J. Frey, Esq. late a member of the senate of this state, and resident near the place where Kesler then lived. " Dr. Atwater was the family-physician of Mrs. Halcomb, for whom Kesler officiated as bar-tender. The doctor informs me, that while in attendance at court, he called at the county-prison to see Kesler. Other persons were also present, and while retiring, the prisoner beckoned to the doctor to come to him. He did so, and while there, was very earnestly solicited to relate what he would testify to, in relation to the arsenic sold by him to the Halcomb family, and particularly whether he could swear that he (Kesler) had purchased it, at the same time observing, " that it was Mrs. Halcomb's boy who purchased it." On the doctor's answering, that he thought it was the little boy that purchased the arsenic, great pleasure was expressed by the prisoner."

[†] Cooper's Tracts, p. 481.

[‡] Democratic Press, April 14, 1818.

[§] The members present, (March 27, 1818,) and who voted for his execution, were, De Witt Clinton, Governor; James Kent, Chancellor; Smith Thompson, Chief-Justice; and Ambrose Spencer, Judge.

I will only subjoin to these a case which lately occurred in Germany, and which is peculiarly interesting from the chemical examination that was pursued. I have referred to it at page 420.

"The subject of it was a woman, 32 years of age, and whose husband had of late given strong proofs of his desire to be separated from her. Returning one day from work, she found her husband and children had already dined, a portion consisting of potatoes and beans, being left in the oven for her, and to this she sat down with an appetite; but owing to its very unpleasant taste, compared to high seasoning with pepper, she could not eat much of it. Resuming her work, she was in half an hour attacked with a sense of burning heat in the throat, and violent pains in her belly, quickly succeeded by urgent thirst, vomiting, and diarrhœa. The symptoms increased, and on the second day afterwards, medical assistance was called in by one of the neighbours, but the medicines administered were rejected by vomiting, and on the night of the fifth day the patient expired, having on the day preceding her death, been interrogated and given the most collected answers to the officers of justice. It was ascertained that the husband had bought arsenic a short time previously; and two of the children, who had tasted of their mother's dinner, were attacked with symptoms similar to her's, but recovered. No part of the infected food could be procured, from the husband having carefully thrown it away.—On dissection of the body of the woman, the stomach and intestines were found highly inflamed, and the mucous membrane of these viscera in several places was detached.

"The contents of the stomach, consisting of five ounces of yellowish red fluid, in the sediment of which nothing in the form of powder could be detected, either by the touch or the eye, assisted by a microscope, were first subjected to experiment. Being mixed with 24 ounces of distilled water, the whole was subjected to ebullition for an hour, and then strained, when twelve and a half ounces of fluid were obtained, which was made the subject of the following trials: The colour of a piece of litmus paper was not in the least altered by it. An ounce of it, mixed with 20 drops of a solution of ammoniaretted copper, assumed a yellowish-green colour, and deposited a slight precipitate of a similar hue, which, when dried and burnt, emitted a slight but very perceptible arsenical smell, like garlic. Another ounce of it, mixed with half an ounce of a solution of sulphuretted hydrogen, became clouded, and soon after deposited a small yellow sediment, which, treated as the preceding, emitted first a sulphurous, and then an arsenical smell. A third ounce being put in a glass vessel, and made to boil, had as much boiling lime-water added to it, when the mixture became milky, and the sediment also in this case gave a smell of garlic when burnt.—(Experiments like the three preceding, were made with a solution of arsenic, two grains to an ounce of boiling distilled water, and afforded similar results, with this difference, that the precipitates were in larger quantities.) A large tea-spoonful of the fluid being poured on a red-hot plate of copper, after the evaporation of the water, emitted a distinct smell of garlic, and there remained on the copper small white spots surrounded with a black ring, and which spots could only be effaced with difficulty.

"The contents of the small intestines weighing ninety-two drachms, and consisting of a fluid similar to that found in the stomach, mixed with a larger quantity of mucus and a little yellowish excrement, had thirty-two ounces of distilled water mixed with them, and were then exposed to ebullition for an hour and filtered. Owing to the quantity of mucus, it was only at the end of several days that six ounces of filtered liquid were obtained, and what remained on the filter having almost coagulated, no more could be extracted. That which was produced did not, in the slightest degree, redden litmus paper. A portion of it, mixed with a solution of ammoniaretted copper, assumed a dark grass-green colour, and deposited a bright-green precipitate, which, dried and burnt, emitted the peculiar smell of arsenic. Another portion, mixed with a solution of sulphuretted hydrogen, afforded a much larger sediment than in the same experiment with the fluid obtained from the stomach, and which sediment did not differ in the slightest degree from the colour of one of orpiment standing beside it, and it also gave the smell of garlic when burnt. A third portion of the fluid, made to boil, and mixed with boiling lime-water, produced a similar, but much more copious deposit than that obtained in the same trial with the first-mentioned fluid. A tea-spoonful of the fluid poured on a red-hot plate of copper, gave the same results as in the former instance.

"However convincing these proofs were of the presence of arsenic acid in the fluids submitted to experiment, and also of the large quantity of it in that procured from the intestines, still in so important a matter we did not consider them sufficient; and we now proceeded to boil the œsophagus, stomach, and intestines, on the plan proposed by Valentine Rose, in order to detect any particles of arsenic that might be engrained in these parts, or enveloped in mucus, and to procure them in a solid form, or as metal. It may be previously remarked, that although it was now eight days since death, and four days since the parts in question had been removed from the body, and though they had not been kept in a cold room, still they did not emit the slightest putrid smell; they were as yet so firm and tough as to prevent their easily being cut with a common scalpel, and a pair of strong scissars was required for this purpose. On the internal coat of the stomach and intestines, something like a powder or crystals could be perceived, either by the touch or microscope. The weight of the whole was forty-four ounces; they were put into the vessel previously used to boil their contents, along with three pounds of distilled water, and six drachms of caustic potass, and the whole boiled for an hour, when the decoction was separated from the solid parts, by means of a hair-sieve. To procure every thing that was soluble, the solid parts were again boiled in a pound of distilled water, and the decoction strained was added to that already obtained. On cooling the decoction, it assumed a dirty, ropy appearance, and several pieces of fat had formed on its surface, which were removed. It was put on a gentle fire and brought to boil, and nitric acid being gradually added to it to saturate the potass, the fluid assumed a clear yellow colour. A considerable quantity of fatty and mucous matter, dissolved by the potass, was separated and removed by the filter, a few ounces of distilled water being poured over it to wash it. It must here be remarked, that when the potass was added, there was merely a soapy smell, but when the nitric acid was poured on, a very disagreeable arsenical smell was emitted. It was now again put on a gentle fire and neutralised with carbonate of potass, but so as to leave the acid slightly predominant, the fluid slightly reddening bitrum paper; for this purpose fourteen drachms of the salt were required. The decoction had now assumed a darker colour, and after some more mucus was separated by filtration, it weighed about fourteen ounces. It was again brought to boil, and mixed with twenty-eight ounces of briskly-prepared boiling-hot lime-water in a glass cylinder. The mixture became instantaneously muddy, and a whitish grey deposit subsided. The cylinder being allowed to remain untouched for a night, in the morning a transparent fluid was poured off, and the sediment being collected on a paper filter, was washed with distilled water and dried. The precipitate, when dried, had an ash-grey colour, and weighed forty grains; as much pure boracic acid, and ten grains of pure carbon being added to it, they were carefully triturated together, and the whole, weighing ninety grains, were put into a small thin glass retort, provided with a good lute, and exposed to an open charcoal-fire till the retort became red-hot. When cool, the retort was carefully removed from the furnace, and the lute being removed, it was broken. In the bottom of it was a black loose charcoal mass, consisting of boracic acid and carbon, weighing sixty grains. In the neck of the retort, there was deposited *a real regulus of arsenic in the form of a whitish-grey, somewhat granular metallic sublimate.* A piece of fine paper firmly rubbed on this sublimate, had a dark-grey spot formed on it, which, smoothed with a polishing iron, assumed a distinctly metallic polish; and on being burnt, gave a strong arsenical smell. Part of the sublimate boiled in a sufficient quantity of distilled water and filtered, (whereby some undissolved greyish particles remained on the filter) assumed, on the addition of a solution of ammoniaretted copper, a yellowish-green colour, and immediately deposited a beautiful yellowish-green precipitate, (Scheele's green.) On breaking the retort, the small pieces of glass on which was some of the sublimate, were collected together, and a piece of smooth paper wrapped in it and burnt at the candle, when a strong arsenical smell was produced, so as to oblige us to open the doors and windows.

" The quantity of metallic arsenic contained in the sublimate, may be thus reckoned. During the sublimation, an empyreumatic fluid collected in the receiver, which did not redden bitrum paper, nor did not alter the solution of ammoniaretted copper, and consequently appeared to consist merely of water, which had been united with the powder, at a low temperature The weight of this fluid was twenty-five grains, and this added to sixty grains of residuum in the retort, makes eighty-five grains. Further, allowing that two grains of the in other respects fire-proof boracic acid, might be mechanically covered up with the moisture, we have remaining at least three grains of metallic arsenic in the sublimate. Seeing that Proust and Rose's manifold and repeated experiments coincide in establishing that, in 100 parts of metallic arsenic, there are 333 of arsenic acid, (white arsenic) it follows that three grains of metallic arsenic are four of white arsenic; and it may be with certainty affirmed that these four grains of arsenic acid actually were present in the viscera examined by us, and were separated by us in a metallic form."*

ANTIDOTES. It will not comport with the object of this work to enlarge much on the present topic; but it is, notwithstanding, proper briefly to notice the most approved mode of treatment.

Our indications are three: 1. To remove the poison. 2. To protect the stomach and intestines from its effects; and 3. If the patient survive long enough, to diminish inflammation.

The first is attempted by means of an emetic, as the sulphate of zinc; but if vomiting be present, we may aid it by dilutents, or a vegetable emetic. Tartrite of antimony should never be given.

But when vomiting does not take place immediately from the means just directed, the urgency of the case warrants us in using more direct remedies. Renault recommends that the stomach be washed and emptied mechanically, by means of a large tube of elastic gum, and a syringe. In this way, a certain quantity of liquid may be thrown in, to dilute or suspend the poison, and, by the action of the syringe, the whole may be again withdrawn.† Mr. Jukes, of London, has prepared an apparatus on this principle, which has been applied successfully both to dogs and the human subject.‡

The second indication may be effected by means of milk, lime-water, soap, drinks sweetened with sugar, or honey. Fat substances, as oil, butter, grease, &c. are considered of doubtful utility, and, indeed, according to Renault, they are dangerous. All the animals to whom he gave the arsenious acid, in butter or grease, died sooner than if they had swallowed the poison alone.§

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* Quart. Journ. For. Med. and Surg. vol. 2, p. 108, copied from Rust's Medical Magazine, a German periodical work.

† Edinburgh Med. and Surg. Journal, vol. 7, p. 91.

‡ New-York Med. and Phys. Journal, vol. 1, p. 518. It is certainly astonishing that Mr. Jukes should claim this as an invention of his own, since Renault evidently proposed it many years before him. The work of the latter is reviewed in the Edinburgh Medical and Surgical Journal for 1811. But even were not this so, we can still adduce a prior claim to the invention in question, for our own country. Dr. Physick, of Philadelphia, published a paper in 1812, in which he mentions that he *successfully* applied the syringe to a child poisoned with laudanum: and Dr. Dorsey afterwards cured two individuals by the same treatment. That distinguished surgeon, however, subsequently states that Dr. Alexander Monro, jun. first suggested the invention in 1797, although he (Dr. Physick) was ignorant of this fact when he applied it practically. I conceive Dr. Physick is entitled to the *honour of having been the first who saved life by its means.*—See Eclectic Repertory, vol. 3, p. 111 and 381; and American Medical Recorder, vol. 6, p. 294.

§ Orfila, vol. 1, p. 151.

I place under this class the successful case lately published by Mr. Joseph Hume, where, after the vomiting had ended, and retchings and pain remained, he administered the carbonate of magnesia very freely, with tincture of opium, suspended in water. In five days the patient was well. One or two cases have since been published, which evidently increase the character of this remedy.*

3. Dr. Yelloly first suggested the propriety of treating the secondary effects like a case of gastritis, and Dr. Roget adopted it with success. Several cases have since occurred, in which venesection, blisters, &c. were used with the happiest consequences.†

As to antidotes, strictly so called, we unfortunately have none. The *sulphuret of potash* had once a high reputation, but we shall hereafter shew that this is itself a poison. Renault tested its efficacy on animals, and found that they died even sooner when this pretended antidote was administered, than when they had taken the arsenious acid solely.‡ *Sulphuretted hydrogen* was rather more successful, but only when the poison was taken in a fluid, and not in a solid form. *Sulphur* has been suggested on the principle of its uniting with the arsenic, but even this has little effect. *Charcoal* has been recommended, in consequence of the experiments of Bertrand, and it would seem to have attained a partial celebrity. The results obtained by Orfila are, however, destructive to its character, and I should consider it very hazardous to depend on this substance.§

Dr. Chisholm has lately mentioned that the juice of the sugar-cane is the best antidote against arsenic. He states, that it has been tried upon various animals in the West Indies, with complete success.‖

MEDICAL POLICE. A substance so dangerous as arsenic, should certainly not be exposed for sale in so public a manner as it is at present. Its uses are very confined, and except for one article of medicine, it is not required by the physician. In this country, I am not aware that it is applied in the arts. Why then should every apothecary and druggist be allowed to vend it? Certainly, amid the multiplicity of our laws, an act restricting its sale would be a public blessing.

The king of Prussia is said to have issued some important regulations on this subject in his dominions, but I regret that I have not been able to ascertain the particulars of them.¶ In France, the sale of arsenic is strictly guarded; and, in England, a bill was pending before parliament in 1817, and which doubtless passed, directing all apothecaries and others to affix a printed label, with the word "*poison*," on every phial, box, or parcel into which they put white arsenic, corrosive sublimate; acetate, carbonate, muriate or nitrate of barytes; oxalic acid, sugar of lead, prussic acid, tartar emetic, solid opium, or laudanum sold by them. All arsenic kept for sale is to be mixed with carbon, and all oxalic acid with rose-pink.* Surely, some or all of these provisions might be incorporated with advantage into our code of laws.

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* Journal For. Science, vol. 2, p. 223, from the London Med. and Phys. Journal for Nov. 1821. Quart. Journ. For. Med. and Surg. vol. 5, p. 304.

† See M'Leod, in Edin. Med. and Surg. Jour. vol. 15. Davies, in Lond. Med. and Phys. Jour. vol. 28.

‡ Edin. Med. and Surg. Jour. vol. 7, p. 90. Orfila, vol. 1, p. 141.

§ Ibid. vol. 1, p. 500; vol. 2, p. 470.

‖ Brande's Journal, vol. 10. p. 193. Edin. Med. and Surg. Journal, vol. 4, p. 416. In the latter, cases are related of its efficacy.

¶ Edinbugh Med. and Surg. Journal, vol. 9, p. 351; vol. 13, p. 143.

I shall notice the remaining compounds of arsenic in as brief a manner as possible, since few of them are ever used as the instruments of murder.

The arsenites. The alkaline arsenites are soluble in water, and act as violent poisons. And among them, that formed with potash deserves particular attention, since it is the substance commonly called *liquor arsenicalis*, or FOWLER'S SOLUTION. It is not necessary to notice its application in medicine; but I may add, that while practitioners in England seem to increase in their partiality for it, and extend its administration to various and opposite diseases, the continental physicians speak discouragingly of its utility. Broussais, in France, declares, "that almost all the patients who have been cured of intermittents by arsenical preparations, have died some months afterwards, either from phthisis pulmonalis, or from chronic inflammation of the mucous membrane of the stomach and intestines."† At all events, there can be no doubt but that it should be used with circumspection, and not until other remedies have failed. It is evidently capable of accumulating in the system, and thus may predispose the patient to serious diseases.‡

All the tests already mentioned act on the arsenites as on the arsenious acid, and the precipitates can be reduced in the same manner. The muriate of platina, however, which does not act on the latter, throws down a yellow precipitate with the arsenite of potash.§

Arsenic acid is to be considered as a more violent and rapid poison than even arsenious acid. This was abundantly proved by the experiments of Brodie, Jaeger, and Campbell. Its action is, however, similar.

The operation of tests is somewhat different, Orfila observes, that sulphuretted hydrogen throws down a whitish and slightly-yellow precipitate; but Dr. Gordon found, in his experiments, that it had no effect on this acid.|| Nitrate of silver throws down a *brick-red* precipitate. The sulphate of copper is not disturbed by the arsenic acid,

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* Eclectic Repertory, vol. 9, p. 561.

† Edinburgh Med. and Surg. Journal, vol. 9, p. 351.

‡ Paris' Pharmacol. p. 209. Dr. Astbury (Edin. Med. and Surg. Journal, vol. 15, p. 415,) relates a case, where the solution of arsenic, given as a medicine, produced vomiting; and, in process of time, anasarcous swellings of the legs and thighs, and of the penis and scrotum. He supposes that a torpor of the absorbents had been induced by its use. Eruptions, paralysis, and ptyalism, have also been witnessed from it.

§ Orfila, vol. 1, p. 153.

|| Gordon, p. 37.

but gives a blue precipitate with the arseniates. This acid may also be reduced with the black flux, as also the *arseniates*.

Sulphurets of arsenic. The native sulphurets (orpiment and realgar) have been administered by Hoffman and Renault, to dogs and other animals, without occasioning the slightest derangement; but when the latter administered the artificial sulphurets, even in doses of three or four grains, they produced vomiting, purging, and death; and, on dissection, the mucous membrane of the stomach was found inflamed and ulcerated.[*]

It is an interesting question, why this difference exists? By Thenard it has been suggested, that the artificial sulphurets contain some oxygen, while none is found in the native ones. Analysis has not, however, been able to detect it in the former.

In order to detect the metal, the sulphuret should be dried and heated in a glass tube, with a little caustic potash. Sulphuret of potash is produced, and metallic arsenic sublimes, coating the sides of the tube.[†]

The *black oxide of arsenic* deserves attention, since it is the basis of the *fly-powder*, which is much used in France and Germany to destroy animals, and hence may often be the cause of accidental poisoning. Renáult, in his experiments on dogs, found it quickly mortal, and when it had acted sufficiently, it produced in the stomach an exudation of blood, and infiltration of the same between the coats of that viscus, without any trace of erosion.[‡] Jaeger witnessed the death of a girl, aged sixteen, who was poisoned by drinking water that had stood on it. She made no complaint of pain, and retained her senses to the last, asking for every thing she wanted. Nine hours after death, the skin exhibited no change, except its paleness and a few blue spots on it. On dissection, a slight spotted redness was found about the cardia—the bottom of the stomach was discoloured, and there was a small brown spot, where the villous coat seemed as if superficially burnt.[§] In several cases quoted by Orfila, the stomach was inflamed, and red spots, with extravasated blood, were present.[‖]

Arsenical hydrogen gas. This substance has proved fatal to a distinguished chemist, the late Mr. Gehlen, of Munich. He was distilling a mixture of arsenic in powder and caustic potash, in order to observe the action of the latter on the former. Finding that the combination was taking place very slowly, he applied his nostrils several times to the flask which contained the mixture, in order to ascertain by the odour the state of the mixture. About an hour afterwards, he was seized with uninterrupted vomiting, rigor, and excessive prostration of strength: these symptoms continued for nine days, when he died, although every effort was made for his relief.[¶]

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[*] Orfila, vol. 1, p. 155. Dr. Smith has, however, shown that the *native sulphuret*, when applied to wounds, causes death. Ibid. vol. 2, p. 464.

[†] Ure *ut antea*.

[‡] Edinburgh Med. and Surg. Journal, vol. 7, p. 80.

[§] Edinburgh Med. and Surg. Journal, vol. 7, p. 80.

[‖] Orfila, vol. 1, p. 160.

[¶] Male, p. 176.

It has been suggested, that this gas, on being inspired, is decomposed in the lungs, the hydrogen uniting with the carbonic acid, while the arsenic is deposited in the bronchiæ.*

Arsenic in its metallic state oxidizes so readily, that it would be extremely hazardous to pronounce it innoxious. Renault has, however, given two drachms of mispickel (an alloy of arsenic and iron) to animals, without any injurious effects. This fact gives us the assurance that the arsenic which is sometimes contained in tin need not be feared, as it is in the metallic state.†

MERCURY.

CORROSIVE SUBLIMATE.

This substance, like arsenic, is poisonous, whether internally or externally exhibited; but a larger quantity is required to produce deleterious effects.

INTERNALLY. (*a*) *Its exhibition by the mouth.* If corrosive sublimate be exhibited in considerable doses, and especially if its use is too long continued, it causes cholic and vomiting. These are succeeded by affections of the salivary glands, ptyalism, swelling of the tongue and gums, destruction of the teeth, and swelling of the face and head. Cardialgia, diarrhœa, dysentery, phthisis pulmonalis, tremors of the limbs, paralysis, or even death, have been the consequence of persisting in such a course for an improper space of time.‡

Dreadful as this catalogue of ills may appear, it is usually aggravated when we are called to view a patient *poisoned* by this mineral. The dose is then larger, and the effects are more immediate. We may state the *ordinary* symptoms in such cases to be the following: "An acrid, astringent, metallic taste in the mouth; a sensation of stricture and burning heat in the throat; anxiety, and rending pains in the stomach, and in the whole of the intestinal canal; nausea, frequent vomiting of a fluid, which is sometimes bloody, and accompanied with violent efforts; diarrhœa, sometimes dysentery; pulse small, tight, and frequent; faintness, general debility, difficulty of breathing, cold sweats, cramps in all the limbs, general insensibility, convulsions, and death."§

In addition to these, it has been noticed by some observers that there is a great diminution in the secretion of urine. Dr. Henry of Manchester, in a case where death followed in four days, remarked that no urine was voided after the third day, and on introducing the catheter, the bladder was found empty.|| In the cases related by Mr. Valentine, where a mother poisoned herself, and four children, the same observation was made. One child died in twelve hours after taking the poison, and during this period, no urine was secreted;

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* London Med. Repos. vol. 4, p. 431. Brande's Journal, vol. 3, p. 298.

† Edinburgh Med. and Surg. Journal, vol. 7, p. 90.

‡ Orfila, vol. 1, p. 47.

§ Ibid. vol. 1, p. 60.

Edinburgh Med. and Surg. Journal, vol. 7, p. 151.

another in twenty-four hours, and voided a very small quantity. The third died in thirty-one hours and secreted none; while the mother, who lived seventy hours, only passed a very little."*

It must also be remarked, that the pain and stricture in the pharynx and œsophagus are sometimes so severe as to cause the greatest distress in swallowing even the mildest fluids; and, in one instance, they were so excessive, as for some hours to destroy the power of speech.† Bloody vomiting is not uncommon, and coagulable lymph has been found in the matter purged, mixed with clots of blood.‡ In fatal cases, the pain at the scrobiculus cordis continues without intermission, and in those who recover, it is among the last symptoms that disappear. In Dr. Henry's patient, a complete paralysis of the upper and lower extremities occurred a few hours before death.

(*b*) *By injection into the anus.* We have reason to believe, from the result of experiments on animals, that the effects of the poison administered in this way would be similar to the former. The only case on record, that I have noticed, is a complex one; from the extraordinary combination of poisons given to destroy life. As, however, the corrosive sublimate appears to have been the immediate agent of death, I shall mention it in this place.

Sir Thomas Overbury was poisoned in the year 1613, in the Tower of London, at the instigation of the Earl and Countess of Somerset. The agents were punished, but the principals escaped. From the confession of Franklin the apothecary, it appears, that the Countess wished to procure the strongest possible poisons for Sir Thomas. He accordingly bought seven, *aqua fortis, white arsenic, mercury, powder of diamonds, lapis costitus, great spiders, and cantharides.* All these were given at different times. Sir Thomas never eat white salt but there was arsenic put into it; and Mrs. Turner, when two partridges were sent to him, and water and onions were the sauce, put in cantharides, instead of pepper. Indeed, said Franklin, he seldom eat any thing in which there was not poison.

Richard Weston, while acting as keeper to Overbury, procured a poison of a green and yellow colour (rosalgar) and mixed it with his broth. He procured white arsenic and mixed it with the food, and, in addition, mingled some corrosive sublimate in tarts and jellies. *The sublimate was also dissolved in a clyster and administered to the prisoner.* This produced, according to the confession of Weston, sixty stools, together with vomiting. Sir Thomas died the next day.§

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* Edinburgh Med. and Surg. Journal, vol. 14, p. 468. The only one (a child) that recovered, in consequence of having taken a smaller quantity, voided no urine in three days.

† Case by Mr. Anderson, Edinburgh Med. and Surg. Journal, vol. 14. p. 474. On the contrary, a case is related by Mr. Saunders, where the patient lived nine days, and during that period experienced little pain, and only felt some soreness after the sixth day. Hiccup was present during part of his illness.—London Med. Repository, vol. 2, p. 458.

‡ Valentini *ut antea*. In two of these cases, coma and insensibility of the pupils were present for some time before death.

§ Hargrave's State Trials, vol. 1, p. 323, 345.

EXTERNALLY. *Applied to a wound or ulcer, or to the skin.* Orfila quotes several cases, illustrating the dangerous and indeed fatal effects of this mode of application. I shall only cite one, from Pibrac. "A strong robust woman, aged forty-nine years, of a good temperament, having an ulcerated cancer of the breast, was entrusted to the care of an empiric, who employed upon her his white powder, externally applied. It was corrosive sublimate. The patient was in great pain after the application; the pains of the cancer greatly increased, and in the space of a few hours became intolerable. A crowd of accidents occurred at once; oppression, nausea, vomitings, which extended even to blood, and convulsive motions the most violent. In fine, she suffered, in every part of her body, a dreadful torture, from which she was not delivered till the next morning by a horrible death."*

A solution of corrosive sublimate in alkohol, applied to the skin, has produced, within a few hours, violent pains of the stomach, accompanied with sickness, vomiting, and diarrhœa. The debility that follows is of the most alarming kind. In one instance, the stools consisted of blood and mucus, and it is evident, that if the use of this noxious substance had been continued, fatal consequences would have ensued. Salivation seems to be a constant effect from this mode of application.†

Appearances on dissection. After an examination of the experiments that have been made on animals as well as of cases of poisoning, Orfila comes to the conclusion, that it is impossible in the present state of science to point out, with precision, "the seat, extent, and character of the lesion produced by corrosive sublimate," and the main argument in favour of this opinion seems to be the fact, that similar effects are produced by other corrosive poisons. But although this may be allowed as a correct position, yet it is still necessary to point out the appearances that have been noticed. If they are common to other substances, we shall only have the disadvantage of repetition.

I shall merely notice the results ascertained in individual cases. Foderè mentions some dissections, in which various parts of the stomach and intestines were found inflamed or gangrenous. In one instance, the villous coat of the stomach was destroyed.‡

In the case of Dr. Henry, already quoted, the external appearance of the stomach and intestines was perfectly natural. About two ounces of a thick yellowish ropy fluid were found in the stomach, which was but moderately distended with air. On its inner surface, numerous dark-red spots, indicating inflammation of the villous coat, were observable. They extended through the whole length of the smaller curvature, and occupied the greater part of the fundus, but did not appear in the lower portion of the large curvature. No abrasion of the villous coat was perceptible. The inner coat of the duodenum, as far as the middle of its length, presented the same appearance of inflammation. The lower part of the œsophagus, for about three inches above the cardia, was slightly inflamed; but, higher up, it was of a natural colour. The heart, lungs, liver, and spleen were sound. The gall-bladder was emptier than usual. The left kidney was of a looser texture than natural, and a small abscess was discovered in it, filled with pus. *The bladder was empty and exceedingly contracted.*

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* Orfila, vol. 1, p. 59.

† Cases of this nature are related by Dr. Anderson (Edin. Med. and Surg. Jour. vol. 7, p. 437,) and Mr. Robertson (ditto, vol. 8, p. 195,) and by Dr. Cloquet of himself, communicated to Orfila, (vol. 2, p. 462.) In this latter, vomiting, gripings, and tenesmus were induced, barely from plunging his hands several times in a concentrated solution, for the purpose of taking out some anatomical preparations, and neglecting afterwards to wash them.

‡ Foderè, vol. 4, p. 151.

In each of the four cases, of Mr. Valentine, he found the stomach greatly diseased. Black circular patches, about three inches in diameter, were observed, and from them an extensive inflammation of the inner coat diverged in all directions. "In the child which died first, the texture was totally destroyed through all the coats, as far as the circular patch extended, and on washing off the destroyed parts, only the peritoneal covering of that part of the organ was left. It cannot be better compared," he observes, "than to a piece of leather *burnt with a red-hot coal.*" The intestines were highly inflamed. The gall-bladder in every case was greatly distended with bile. The peritoneum generally inflamed, as were also the mesentery and omentum. In one instance, the kidneys were inflamed. *In all, the urinary bladder was much contracted; in the mother, it was of the size of a walnut, and in one of the children, no larger than a marble.*

The bodies externally were of a crimson colour, posteriorly, on the shoulders, back, and hips.

In the case related by Mr. Saunders, the stomach generally was inflamed, and its cavity was lined with a considerable quantity of viscid and glutinous mucus, but there was nothing like corrosion or sphacelus. The liver, spleen, and other viscera were not unhealthy.*

Effect on animals. The experiments of Mr. Brodie are among the most satisfactory of any that have been made, and they correspond in most particulars with the results observed on the human subject.

He injected into the stomach of a rabbit, by means of an elastic gum tube, six grains of corrosive sublimate, dissolved in six drachms of distilled water. No immediate symptoms followed the injection; the animal made no expression of pain, but in three minutes he became insensible, was convulsed, and in four minutes and a half from the time of the injection being made, he died. On opening the thorax, the heart was found to have entirely ceased acting, and the blood in the cavities of the left side was of a scarlet colour. The stomach was much distended. The pyloric and cardiac portions were separated from each other by a strong muscular contraction, which appeared to have prevented the passage of the fluid from the upper to the lower part, since the contents of the pyloric portion were firm and solid, and in every respect resembled the usual contents of the stomach, while those of the cardiac portion consisted of the food of the animal much diluted with fluid. In the pyloric portion, also, the mucous membrane had its natural appearance, but in the cardiac portion, it was of a dark-grey colour, readily torn and peeled off, and in some parts its texture was completely destroyed, so that it appeared like a pulp, on removing which, the muscular and peritoneal parts were exposed. A similar experiment, with a scruple of corrosive sublimate, on a cat, produced death in twenty-five minutes; and, on dissection, the texture of the stomach was found destroyed as in the preceding case, the mucous coat tore and separated from the muscular with great facility, and the upper part of the duodenum was similarly altered, although not in so marked a manner.

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* London Med. Repository, vol. 2, p. 458.

The same experiments were now performed on a dead rabbit and cat, and *precisely the same appearances were found on dissection*, except that as the middle contraction was wanting, the disorganization was not confined to the cardiac portion.

The conclusion drawn by Mr. Brodie is the following: "Corrosive sublimate, when taken internally in large quantities, occasions death by acting chemically on the mucous membrane of the stomach, so as to destroy its texture; the organs more immediately necessary to life being affected in consequence of their sympathy with the stomach."[*] He also denies the idea of the absorption of the poison in these cases. This, however, is believed by many physiologists, and at all events is far from being a settled question.[†]

Corrosive sublimate has been considered as nearly innoxious to horses, and has been given in doses of several drachms without producing any apparent effects. An instance is however related by Dr. Reeve, where two ounces produced death in eight hours, and previous to this, there was a copious discharge of urine and fœces. On dissection no inflammation was observed in the coats of the stomach; the intestines, however, were flabby and tender, and putridity had far advanced in them. The liver and kidnies were in a putrid state.[‡]

In several experiments made by Dr. Bostock and others on dogs, with small doses of this mineral, vomiting and purging, with symptoms of violent pain, ensued, and after some hours they terminated in death. In one case on dissection, the peritoneal coat of the stomach was found inflamed, and the vessels of its internal surface were injected, so as to present a general redness; but there was a very slight corrugation of the coats, and no erosion; but in another instance, where the dose had been larger, the villous coat was much corrugated and inflamed, and on that part of it which lines the small curvature, there was much blackness, which had the appearance of blood extravasated between the coats. On cutting however through the villous coat, there was no extravasation.[§] The quantity in these and similar cases will doubtless produce a variety in the appearances.

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[*] Edinburgh Med. and Surg. Journal, vol. 7. p. 462.

[†] See Edinburgh Med. and Surg. Journal, vol. 11, p. 126.

[‡] Ibid. vol. 5, p. 254.

[§] Bostock's Vindication, p. 28.

Chemical proofs. There is some difference among chemists, as to the precise solubility of corrosive sublimate; but we shall probably be correct in stating, that from sixteen to twenty parts of distilled water will dissolve one part. And this fact should be remembered, as it will prevent an unnecessary addition of fluid.

The tests suggested for the detection of this mineral are numerous, some being applicable to the suspected substance when in a solid, and others when in a fluid state.

(*a*) If a powder is collected, and is supposed to be corrosive sublimate, add charcoal and a little water to it, and thus make a paste. If this be submitted to the action of heat, in a close vessel, metallic mercury is obtained from the decomposition of the salt.

(*b*) If corrosive sublimate be let fall in minute fragments into a tube of glass, the bottom of which contains a little pure caustic potash, melted by heat, one portion of the salt rises in the form of smoke to condense itself on the sides of the tube; while another portion sinks down and takes a red colour. If the heat be continued for five or six minutes, metallic mercury, in the form of globules, is obtained, adhering to the sides of the tube, and mixed with the corrosive sublimate that is not decomposed. If the quantity be small and difficult of detection, dissolve the remainder of the salt, and the globules will be precipitated.

(*c*) Expose a small quantity of the powder without any admixture, to heat, in a coated tube, corrosive sublimate will be ascertained by its rising to the top of the tube, lining the inner surface in the form of a shining white crust, and with its peculiar crystalline form. These last, if necessary, should be examined with the microscope.

(*d*) If this sublimate be thrown on burning coals, it immediately volatilizes, giving out a thick white smoke, and a pungent smell, not at all resembling garlic, and which, when inhaled, often produces irritation and coughing. If a plate of perfectly clean copper be exposed to this smoke, it becomes tarnished, and receives, by a slight friction, that white and glittering colour which characterises mercury.

(*e*) The solution of corrosive sublimate reddens litmus paper, but changes syrup of violets to a green.

(*f*) Lime-water in small quantity precipitates the solution, of an orange-yellow colour, but if increased, the precipitate becomes red. In still greater quantity, " the precipitate is transformed into an oxide at maximum of a beautiful yellow."

(*g*) A solution of saturated carbonate of potash (salt of tartar) produces a deep brick-coloured precipitate.* Carbonate of soda has the same effect.

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* Dr. Henry states, that a white precipitate is produced by the addition of a single drop of the solution in question. Orfila denies this, observing that " the precipitate never begins by appearing white, at least if the solution of the sublimate be considerably diluted." Dr. Henry, however, adds at the same time, that if an additional quantity of alkali be applied, an orange-coloured sediment will be produced.—(Henry, vol. 2, p. 274. Orfila, vol. 1, p. 30.)

(*h*) The caustic alcoholished potash, poured in small quantity on a saturated solution, forms a yellowish-red precipitate, but if on the contrary the potash in excess be poured on it, the precipitate will be a beautiful yellow. The precipitate, both in this experiment and in experiment *g*, on being dried and exposed to heat in a glass tube, will give out metallic mercury.

If, however, the solution of corrosive sublimate is very much diluted, the caustic potash will throw down a white precipitate.

(*i*) A solution of pure ammonia produces a permanent white precipitate. On the application of heat, it becomes yellow.

(*k*) The hydrosulphuret of ammonia, in small quantity, gives a dark precipitate mixed with grey and white, but a larger quantity produces a black one. Sulphuretted hydrogen and sulphuretted water, also throw down a similar precipitate. This is so minute a test, that Professor Pfaff, of Kiel, is said to have discovered the presence of corrosive sublimate, though diluted with forty thousand times its bulk of water.*

(*l*) Nitrate of silver throws down the white curdy precipitate, characteristic of muriatic acid.

(*m*) The muriate of tin gives a white precipitate with corrosive sublimate. This is also an extremely minute test. Dr. Bostock says, that two drops of the muriate, added to a solution which contained $\frac{1}{50000}$ of its weight of the sublimate, caused an obvious precipitate. When diluted, so that the fluid held only $\frac{1}{5000000}$ of its weight of the salt, two drops produced an immediate grey cloud, but no precipitate was thrown down.†

(*n*) The triple prussiate of potash gives a white precipitate, which in a short time becomes yellow, and afterwards passes into a clear Prussian blue. All these changes of colour are generally produced within thirty-six hours.

(*o*) If a perfectly clean plate of copper be plunged into a solution of corrosive sublimate, and left there for an hour or two, it will become tarnished; but, on rubbing it with a piece of paper, it assumes a white, shining, and silvery appearance, owing to a coating of metallic mercury. The same effect will be produced if the corrosive sublimate be dropped on it, or if any of the precipitates obtained in experiments *f*, *g*, *h*, *i*, and *n*, be rubbed over it. This effect is now explained as a galvanic action, and a piece of gold, clasped by a zinc wire, and immersed in the sublimate solution, was obviously whitened in an hour, although the solution in question only contained $\frac{1}{5400}$ of its weight of the salt.‡

(*p*) Mr. Sylvester has proposed another ingenious application of galvanic electricity. "A piece of zinc or iron wire, about three inches in length, is to be twice bent at right angles, so as to resemble the Greek letter Π; the two legs of this figure should be distant about the diameter of a common gold wedding-ring from each other, and the two ends of the bent wire must afterwards be tied to a ring of this description. Let a plate of glass, not less than three inches square, be laid as nearly horizontal as possible, and on one side drop some sulphuric acid diluted with about six times its weight of water, till it spreads to the size of a half-penny. At a little distance from this, towards the other side, next drop some of the solution supposed to contain corrosive sublimate, till the edges of the two liquids join together; and let the wire and ring, prepared as above, be laid in such a way that the wire may touch the acid, while the gold ring is in contact with the suspected liquid. If the minutest quantity of corrosive sublimate be present, the ring in a few minutes will be covered with mercury on the part which touched the fluid."*

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* Annals, vol. 5, p. 22. † Edin. Med. and Surg. Journal, vol. 5, p. 14.

‡ Bostock, Edin. Med. and Surg. Journal, vol. 5, p. 14. The above tests are all taken from Orfila and Henry.

(q) Brugnatelli has proposed the following method: "Take a quantity of fresh wheat-starch mixed with water, and add a sufficient quantity of iodine to give the liquid a blue colour; if corrosive sublimate be added to this liquor, the colour is destroyed and it becomes reddish, and sulphuric acid will not restore it, as is the case when arsenic is added."†

The next point of importance is, whether any substances which by possibility may be present in the stomach, or any of the human fluids, will change the nature of the substance, or will alter the operation of the above tests? Orfila has made this the subject of notice.

Corrosive sublimate, according to him, is decomposed sooner or later, and converted into the sub-muriate, by most vegetable substances, distilled waters, extracts, oils, syrups, honey, and gums. Muriatic acid gas is set at liberty, and calomel will be precipitated, with a portion of the vegetable matter which has undergone some change. A decoction of tea throws down instantly a yellowish-grey precipitate in flakes, which becomes pulverulent, and of a violet colour by desiccation, while at the same time, if the water be much loaded with sugar, no alteration takes place till after several days; and alcohol produces no effect for the space of three or four months. The action of albumen on a solution of corrosive sublimate, deserves particular notice. If a considerable quantity of the latter is poured on the former, a white flaky precipitate is formed, which, on being dried, is brittle, semi-transparent, of a yellowish colour, and insoluble in water. On being submitted to heat in a glass tube, the products are principally charcoal, metallic mercury volatilized and adhering to the sides of the tube, and muriatic acid. Small quantities of corrosive sublimate produce milkiness, and the slow deposition of a precipitate. Gelatine causes similar change and decomposition as albumen. Osmazome gives a reddish-yellow precipitate, and bile a yellow one, inclining to red. A concentrated solution of corrosive sublimate brought in contact with a large quantity of milk, produced no visible change; but when seven parts of the solution and one of milk were united, a white coagulum instantly formed, which collected together, and over it floated a liquor extremely clear. Ordinary soap mixed with it in the proportion of one to six, produced a white precipitate. Fibrin or flesh, on being immersed in a solution of corrosive sublimate, loses its solidity, and becomes friable.

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* Eclectic Repository, vol. 4, p. 452, from Nicholson's Journal, No. 154.

† Annals, vol. 10, p. 151.

It appears thus, that many common substances will decompose the corrosive sublimate, and convert it into the sub-muriate.

The following is the result of the application of tests to some mixtures:*

Substances employed.	Corr. sub. xij. gr. in water, Burgundy wine 6 oz.	Corr. sub. sol. 1 dr. Milk 14 dr.	Ordinary soap, with a small quantity of sol. corr. sub.	Bile 1 dr. corr. sub. 1 gr. dissolved in 1 oz. water.
Effect of these mixtures on each other.	No effect.	Sky-blue colour.	Slightly turbid, no precipitate.	
TESTS. Potash.	Black precipitate	Yellow.	White or grey precipitate.	No precipitate.
Ammonia.	Deep green.	——	Same as corr. sub. alone.	No precipitate.
Prussiate of potash.	White, going to violet.	Passing to blue.	Same as corr. sub. alone.	
Syrup of violets.	Red.	Blackish grey.	Same as corr. sub. alone.	
Hydro-sulphurets.	Same as corr. sub. alone.	Black.	Same as corr. sub. alone.	A precipitate.
Plate of copper.	Same as corr. sub. alone.	Same as corr. sub. alone.	Same as corr. sub. alone.	
Nitrate of silver.		——	Same as corr. sub. alone.	
Lime-water.			Dirty white precipitate.	A precipitate.

The practical advice to be drawn from these results is, the importance of depending upon the reduction of the metal as the only infallible proof. If the suspected substance be in a fluid state, the tests, as previously mentioned, should be applied, and the precipitates should then be dried, evaporated, and reduced. Orfila recommends that a small portion of potash be added to the solution, as this will prevent the volatilization of a portion of the sublimate. Let this be evaporated to dryness, then detach the dry residue and put it in a small glass tube as already described, and gradually heat to redness. Metallic mercury in globules will be quickly obtained.*

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* Orfila, vol. 1, p. 37 to 46.

The same process is proper when the suspected substance is in a state of solidity. Potash should also be added when the reduction is attempted. But if the quantity of the salt is extremely small, it will be better first to make a solution of the whole, and then proceed as before.† But it is possible that the corrosive sublimate may have been decomposed in the stomach, and the submuriate or calomel alone remains. How are we then to act?

Two of the most striking characteristics of calomel are, its insolubility in water, and the black colour which it contracts from the addition of lime-water. Orfila has, however, found that the decomposed precipitate obtained from mixtures of corrosive sublimate with bread, boiled beans, and soup, underwent no change, although it lay in lime-water for twenty-four hours. In another instance, a paste made of whites of eggs, meat, soup, roasted apples, tea, sugar, and sublimate, furnished a greyish-white substance, which was carefully washed; and lime-water, though left on it for forty-eight hours, produced only a slight change of colour, causing it to become somewhat deeper. Corrosive sublimate, it thus appears, forms so strong a union with alimentary substances, that lime-water cannot decompose it. It only remains to add potash to the precipitate, introduce the mixture into a glass tube, and apply heat. Mercurial globules will be produced from the process.‡

But it may be asked, whether a salt so soluble and so easily decomposed, is always to be found, either in a solid or fluid state, in the stomach or intestines? Or, in other words, can an individual be destroyed by this poison, and yet the nicest tests not be able to detect any portion of it after death? The results of modern investigation are decidedly in favour of the affirmative of this question. In the experiments of Dr. Bostock on dogs, the very tests which proved the presence of corrosive sublimate in the most minute quantity, were unable to shew its presence in the fluids of the animals which he had previously poisoned with this very substance, and they only indicated the existence of muriatic acid.[*] Dr. Henry and Dr. Roget examined the fluid vomited by a female who had poisoned herself, with all the tests mentioned in the chemical work of the former, but neither in this liquid, nor in that found in the stomach after death, were any traces of the poison discoverable.[†] "In vain, (says Orfila) should we seek, in the general way, for corrosive sublimate in the liquids vomited; neither are the contents of the stomach more calculated to discover its presence. The decomposition which it has undergone by its union with other substances, has rendered it insoluble. *It is in the solids, in the tissue itself of our organs, that it must be sought for.*" In confirmation of the latter remark, he mentions a case in which he took a portion of the intestines of a cock, and put it in a solution of corrosive sublimate for three days. It was then boiled, then dried in a capsule of porcelain, and finally calcined in a retort. Globules of mercury were soon seen condensed in its neck. The stomach of a dead rabbit, into which a solution of corrosive sublimate had been injected, was treated in the same way, with a similar result.[‡]

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* When corrosive sublimate is mixed with wine, or any other coloured fluid, Orfila proposes that sulphuric ether be added to the solution in a phial, and the contents slowly agitated. The ether will abstract the greater part of the sublimate from the water, as there is a greater affinity between the former and the sublimate, than between the sublimate and the water. The strata must be allowed to separate, and the upper one, (being the ether) should then be poured off. Evaporate the fluid, and the sublimate remains in a pure and solid state.—Quarterly Journal Foreign Med. and Surg. vol. 3, p. 246.

† Orfila, vol. 1, p. 64, 65.

‡ Ibid, vol. 1, p. 69, 70.

I am not aware of any trials for poisoning with corrosive sublimate, of great interest, beyond those already noticed. There is a case mentioned in the Edin. Med. and Surg. Journal, where the mineral was mixed with some dumplings, for the purpose of murder, and in them it was readily discovered by Professor Wollaston of Cambridge.[§]

Antidotes. Alkaline salts and earths were formerly in high repute, as antidotes, against corrosive sublimate, and cases are to be found in medical journals where they would seem to have cured the sufferers.[‖] They have also failed, and the same remark will apply to the sulphurets, the infusion of Peruvian bark, and sugar.

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[*] Edinburgh Med. and Surg. Journ. vol. 5, p. 16. [†] Ibid. vol. 7, p. 150.

[‡] Orfila, vol. 1, p. 73. "Il est extraordinairement rare qu'il se recontre assez de cette substance pour la soumettre aux recherches chymiques."—Metzger, p. 396.

[§] Trial of Michael Whiting for administering poison to George and Joseph Langman, at the assizes holden at Ely, in 1812.—Edin. Med. and Surg. Journal, vol. 8, p. 348. Dr. Smith, in his work, refers to the trial of Miss Butterfield for poisoning Mr. Scawen, which I have not been able to obtain. He observes, that in this case the question was somewhat agitated, whether salivation excited by mercury is ever renewed, after having once ceased, without the administration of the mineral being repeated. Such an instance occurred to Dr. Male, and he adds the following on his own authority: "Dr. Hamilton, professor of midwifery in the university of Edinburgh, related a case in his lectures, of a married lady, who had been under the necessity of going through a course of mercury, in consequence of her husband's imprudence, under the care of the late Mr. Bemet. This gentleman, from motives of delicacy, did not enquire very minutely into the particulars, but, according to the rule of the day, gave his patient a sore mouth. Four months afterwards, she miscarried, and salivation again came on. It was removed for a week, at the end of which it returned, and harassed her for about a twelvemonth."—Smith, p. 114.

[‖] See a case in the Edin. Med. Essays, vol. 6, p. 432, from the *Commerc. Norimb*, 1735, where the *Ol. tartar per deliquium*, and mild drinks, appear to have been the principal agents in effecting a cure. The salt of tartar and salt of wormwood have each been recommended.—Med. Commentaries, vol. 6, p. 324, 415.

We are therefore infinitely indebted to Orfila for introducing ALBUMEN as an antidote to this substance. If taken in sufficient quantity, it decomposes the metallic salt, forming a triple compound, consisting of albumen, muriatic acid, and calomel. Our author proved its efficacy in several experiments on animals. "It has the advantage of being always at hand, and there is no danger of giving it to excess. The practical rule, therefore, is, that as soon as we are called to a person suspected of having taken corrosive sublimate, we should make him swallow as many whites of eggs, well mixed with water, as the stomach can contain. It will immediately decompose the metallic salt remaining in the stomach, and if it excite fresh vomiting, so much the better. Along with this, blood-letting may be had reccurse to, in order to overcome the inflammation already excited."* Mucilaginous drinks are also very useful as accessary remedies.†

Dr. Taddei, of Italy, has lately recommended wheat flour, or gluten, as an antidote. He was led to this, from ascertaining that it reduced corrosive sublimate to the state of calomel, and that considerable quantities of a mixture of flour or gluten with corrosive sublimate, might be taken by animals without any injurious effects. In this way, fourteen grains of sublimate were given in less than twelve hours to rabbits and poultry without injury, whereas a single grain would have been fatal if taken alone. Twenty-five grains of fresh, or thirteen of dry gluten, or from five to six hundred grains of wheaten flour, are necessary to render a grain of corrosive sublimate innocent; and Dr. Taddei recommends that dried gluten be kept for the purpose in question in apothecaries' shops. When administered, it is only necessary to mix it with a little water.‡

THE RED PRECIPITATE AND THE RED OXIDE OF MERCURY. These substances, in considerable quantities, are violent poisons. Ploucquet mentions a case of an individual, who, by accident, swallowed some red precipitate. He immediately experienced violent cholics, copious vomitings, a trembling in all his limbs, and cold sweats.

On being heated in a glass tube, they become decomposed, and give out volatile metallic mercury, and on being applied to a clean plate of copper, they silver it. The hydro-sulphurets also blacken them.§

It is not necessary to notice the other preparations of mercury in detail, since their effects, in large quantities, and their modes of detection, are similar to those already mentioned. And I will only allude to the numerous cases which of late years have been described under the names of *hydrargyria*, *mercurial erithrismus*, &c. as proving that the mildest preparations of mercury may, under certain circumstances, and in peculiar constitutions, prove highly dangerous, and even fatal.

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* Edin. Med. and Surg. Journal, vol. 11, p. 132. Dr. Prechier, of Geneva, has ascertained that it requires an ounce of whites of eggs to neutralize four grains of corrosive sublimate, taken as a poison.—London Med. Repository, vol. 6, p. 167.

† A case in which the whites of eggs were given with perfect success, is related by Dr. Lendrick, in the Transactions of the College of Physicians of Dublin.—London Med. Repository, vol. 15, p. 495. See also another case, in Ibid. vol. 13, p. 480.

‡ Edin. Philos. Jour. vol. 3, p. 406.

§ Orfila, vol. 1, p. 90-91.

MERCURIAL VAPOURS, *and mercury in a state of extreme division.* Mercurial vapours are undoubtedly to be deemed poisonous. Many cases are on record, which prove that workmen employed in mercurial mines, gilders, silverers of looking-glasses, &c. are subject to serious accidents from their callings. This, however, is a point which I shall notice at length in another place, when treating of the *diseases incident to peculiar trades and professions.*

The usual consequences of a long exposure to them, are "trembling and paralysis of the limbs, vertigo, loss of memory and of the other intellectual faculties, salivation and ulceration of the mouth: cholic, asphyxia, asthma, hæmoptisis, atrophy, apoplexy, and death."

The following is a remarkable illustration of the effects of mercury, in a volatilized state, on the human system. A large quantity of quicksilver (about thirty tons) was saved from the wreck of a Spanish ship about Cadiz, by the Triumph man of war and the Phipps schooner, both English vessels. It was placed in their spirit-rooms. An alarming illness soon broke out among the crews, all of whom were more or less salivated. The surgeons, pursers, and three petty-officers, who were nearest the place where it was stowed, felt its effects the most, as their heads and tongues were swelled to the most alarming degree. Every rat, mouse, and cockroach on board the Phipps were destroyed. And it was noticed, that those who slept close to where the quicksilver had flowed in consequence of escaping from the bags, suffered slightly in comparison to those who slept over the bags. Every thing metallic was whitened.

The explanation of this distressing event is not difficult. The quicksilver had lain for some time in salt-water, and when on board, the leather bags containing it rotted. Add to these, the effects of gases generated on board ships, and we have sufficient agents at hand to cause the rise, suspension, and oxidation of the metal. Dr. George Pearson suggested that sulphuretted hydrogen was probably the principal cause.*

Whether metallic mercury should be deemed a poison, is another question, concerning which there is some diversity of opinion. We know that it has often been exhibited in large doses with salutary effects, and indeed in the days of Dr. Dover, two or three drachms of it were a common morning draught, as a preservative against gout and gravel. I apprehend that the proper distinction to be taken respecting it is, that when it can be so acted on as to be oxidated, even in the smallest degree, (as, for example, mixed with fat or oil, or even by friction alone,) it *may* prove deleterious. Mr. Faraday has also contributed a valuable fact in illustration of this subject. He put some mercury in a clean dry bottle, of about six ounces, which formed a stratum at the bottom, not one-eighth of an inch in thickness. A small piece of leaf gold was fastened to the under part of the stopper of the bottle, so that when the stopper was put into its place, the leaf-gold was inclosed in the bottle. It was then set aside in a safe place, and after some time, the leaf-gold was found, on examination, whitened by the mercury. He repeated this experiment several times, with similar results, and he deduces from it the conclusion, *that at common temperatunes, mercury is surrounded by an atmosphere of the same substance.**

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* Edinburgh Med. and Surg. Journal, vol. 6, p. 513. London Med. and Phys. Journal, vol. 26, p. 29.

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* Brande's Journal, vol. 10, p. 354. This deduction will probably explain the following remarks of Dr. Falconer, of Bath. " Instances (he remarks) of the ill-effects even of the external application of mercury, are sometimes found in the use of what are called quicksilver girdles, which are often worn for the itch, especially by females of the lower rank, as being cleanlier and more free from fœtor than a sulphurous application. Many of these cases have been admitted into the Bath Hospital. The general symptoms were, a degree of general weakness, approaching to palsy, great pain and tremor in the limbs, and often violent head-ache."—(Edin. Med. and Surg. Journal, vol. 8, p. 214, quoted from Trans. Med. Soc. of London.)

CHAPTER XVII.

MINERAL POISONS (CONTINUED).

Antimony. *Tartar emetic.* Symptoms—appearances on dissection—effect on animals—chemical proofs—antidotes. *Oxide and glass of antimony. Muriate and sub-muriate. Antimonial wine. Antimonial vapours.* Copper. *Metallic copper*—its ready oxidation. *Oxide and carbonate. Verdigris.* Symptoms—appearances on dissection—effect on animals—chemical proofs—antidotes. Zinc. *Sulphate.* Symptoms—chemical proofs—Whether metallic zinc is a safe substance for domestic utensils. Tin. *Muriate*—effects—tests—antidotes. Silver. *Nitrate*—effects—tests—antidotes. *Fulminating silver.* Gold. *Nitro-muriate*—tests. *Fulminating gold.* Platina. *Nitro-muriate.* Bismuth. *Nitrate*—tests—antidotes. Iron. *Sulphate.* Lead. *Acetate.* Symptoms—effects on animals. *Ceruse.* Water impregnated with lead. *Litharge.* Articles of food or drink contaminated with lead. Earthen vessels glazed with lead—action of vinegar, apples, milk, on them. Adulteration of wines—cider—rum. *Saturnine emanations.* Symptoms—chemical proofs—wine test—antidotes. Phosphorus, Effects. Iodine. Effects. The concentrated acids. *Sulphuric.* Symptoms—appearances on dissection—chemical proofs—treatment. *Nitric.* Arrangement by Tartra, of poisoning by it, into four classes. Symptoms—appearances on dissection—chemical proofs—treatment. Caustic and carbonated alkalies. *Potash. Sub-carbonate of potash,* Symptoms—appearances on dissection. *Soda. Ammonia.* Barytes and its salts. Effects on animals—symptoms—chemical proofs—antidotes. Quicklime. Liver of sulphur. Effects—appearances on dissection—treatment. Nitre. Symptoms—appearances on dissection—treatment. Sal Ammoniac. Gases. *Chlorine,* gaseous and fluid. *Nitrous acid gas. Sulphurous acid gas. Nitrogen. Carbonic oxide.* Glass and enamel. Remarkable medico-legal case. General directions for ascertaining the nature of a suspected mineral substance by chemical tests—soluble substances—insoluble substances. Laws on poisoning, when death does not immediately follow.

ANTIMONY.

A great prejudice formerly existed against the use of metallic preparations, with the exception of iron, and this was carried to such a height, as to the compounds of antimony, that the faculty of Paris (among whom Guy Patin was the most conspicuous) obtained an edict of the parliament of Paris, prohibiting their use as a medicine. Nor was it until one of their sovereigns had been cured by the use of antimony, that they (in 1666) demanded a sentence permitting its use.* It is to be feared, however, that the various preparations are often rashly and improperly employed at the present day.

Tartar emetic. This substance, in large doses, must undoubtedly be deemed a poison. It is, however, far from being as certainly destructive as arsenic or corrosive sublimate.*

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* Phil. Trans. vol. 2, p. 710. See also Note to Abridgment, vol. 1, p. 596.

The narrative of a few cases will properly precede the list of general symptoms.

A Jew, by mistake, took about twenty grains of tartar emetic in the morning, fasting. In a few moments after swallowing it, he experienced pain in the region of the stomach, which increased, and even brought on syncope. After this, excessive vomitings of bilious matter came on with alarming rapidity; aqueous stools occurred incessantly; the pulse was small and concentrated; the face pale; there was great prostration of strength, and the patient complained greatly of extremely painful cramps in the legs. By the use of proper remedies, the symptoms subsided after an illness of about six hours, and debility and painful digestion alone remained.†

A man, aged about fifty years, determined to poison himself, and for this purpose took about forty grains of tartar emetic on a Saturday morning. Vomiting, frequent stools, and convulsions soon succeeded. He was received into the Hotel Dieu on Sunday evening. On Monday morning he complained of violent pains in the epigastrium, which was distended. He could with difficulty move his tongue; he was, in fact, in such a state that he might be taken for a drunken man—he just spoke, and his pulse was imperceptible. During the day, his abdomen became inflated, the epigastrium was considerably tumefied, and became more painful: in the afternoon delirium came on. On Thursday, all the symptoms increased; in the evening there was furious delirium; convulsions supervened, and he died at night.‡

The following is a remarkable case. An individual had collected about twenty-five grains of tartar emetic for the purpose of poisoning himself. He went into a coffee-house and asked for a glass of sugared water, and having dissolved the mineral in this, he drank it down. After leaving the coffee-house, which he did instantly, he had scarcely proceeded twenty steps, before he felt a burning pain in the epigastric region, accompanied by convulsive movements and a loss of his senses. He was carried in this situation to the Hotel Dieu, ten minutes after the accident. On coming a little to himself, he confessed his crime, and a decoction of bark was immediately administered in large quantities. The skin was cold and clammy, the breathing a little short, the pulse small and concentrated, and the epigastric region a little tumefied and very painful, hiccup tolerably frequent, but *no vomiting.*

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* A case is quoted by Orfila, where a female swallowed six drachms. Vomitings immediately ensued, but she was soon relieved from these, and recovered without any subsequent injury. (Vol. 1, p. 169.) We can explain the *rationale* of this case, but I confess I do not understand the exemption which appears to be experienced in Italy from the ordinary effects of this powerful medicine—*miror magis.* One physician states that he has given five scruples in fourteen hours, without the patient having either *vomiting* or *diarrhœa.* Dr. Bellati also furnished a list of doses given at the hospital of Pavia, and among these is tartar emetic, *from half a drachm to three drachms daily.*—Dr. Bell in Chapman's Journal, vol. 8, p. 30 and 33.

† Case by Dr. Barbier, of Amiens, from Magendie.—Orfila, vol. 1, p. 174.

‡ Case by Dr. Recamier, from Magendie.—Orfila, vol. 1 p. 177.

The symptoms gradually diminished in violence after taking the bark, and in two hours, copious stools occurred and continued for several hours. On the next day, he vomited several times, and gastritic symptoms were present for a week, but were removed by the usual remedies.[*]

From these and other instances, the following list of symptoms may be deduced: a rough metallic taste, nausea, copious vomitings, frequent hiccup, cardialgia, burning heat in the epigastric region, pains of the stomach, abdominal cholics, inflation, copious stools, syncope, small, concentrated, and accelerated pulse, cold skin, but sometimes intense heat, difficult breathing, vertigo, loss of sense, convulsive motions, very painful cramps in the legs, prostration of strength, and death.[†] Sometimes to these symptoms is joined a great difficulty of swallowing, and deglutition may be suspended for some time.[‡] The vomitings and alvine excretions do not always take place, and the consequence of this is an increase in the violence of the other symptoms.[§]

There can be no doubt, from the marked effects of the tartar emetic ointment, as stated by medical observers, and in particular by the illustrious Jenner, that its external application in large quantities would produce injurious consequences. And this indeed is amply confirmed by the results of experiments on animals, as we shall hereafter state.[||]

Appearances on dissection. The mucous membrane of the stomach is usually red, inflamed, and covered with mucus. The duodenum is in a similar state, and occasionally the other small intestines. The lungs are often found more or less inflamed, and in some instances the brain is so also, and contains serous fluid. Hoffman mentions a case, where the stomach was found sphacelated, and the spleen, diaphragm, lungs, and the parts adjacent to the affected part of the stomach, were gangrenous. In a general way we may state, that the lungs and the mucous membrane of the digestive canal, are the organs principally affected by this poison.[¶]

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[*] Case by Dr. Serres, from Magendie.—Orfila, vol. 1, p. 175.

[†] Is not the case in the Edinburgh Medical Essays, vol. 1, p. 85, entitled "*The bad effects of opium given too soon to stop the operation of emetics,*" an instance of poisoning by tartar emetic?

[‡] Foderè quotes a case by Dr. Carron, where there was a suspension of deglutition for two days, vol. 4, p. 156.

[§] Orfila, vol. 1, p. 178. Male mentions the case of a child who had taken a large dose, and in whom no vomiting occurred. He lay in a state of insensibility, the extremities were cold, the pulse languid and almost imperceptible, but by taking some strong brandy and water, these effects were removed, and violent vomiting succeeded, and the patient recovered, p. 166.—See also Journal of Foreign Science, vol. 1, p. 640.

[||] Dr Francis states, that in two cases where tartar emetic was used externally, in the form of ointment, for a longer time than was proper, the effects upon the constitution of the patient were similar to those at times arising from arsenic employed in the same manner; a comatose state, feeble pulse, inability to muscular exertion, and enlargement of the smaller joints. These consequences continued several months. —MS. communication.

[¶] Orfila, vol. 1, p. 177 to 180.

Effect on animals. Magendie and Brodie have each investigated the effects of this salt on animals.

The former ascertained, that whenever the œsophagus was tied up in dogs, so as to prevent vomiting, four, six, or eight grains produced death at the end of two or three hours; while those who were able to get rid of it by vomiting, often took a drachm, without experiencing any material bad effect. Large doses, (as half an ounce) however, generally caused death in a few hours, or a few days, although instances did happen, where no accident followed from their exhibition.

When a solution of tartar emetic of six or eight grains to three ounces of water was injected into the veins of a full-grown dog, vomiting and purging ensued, the breathing became difficult, the pulse frequent and intermitting, and great disquietude and tremblings of the limbs preceded death. On dissection, the lungs were observed of an orange or violet colour, and distended with blood, while the mucous membrane of the intestinal canal, from the cardia to the rectum, was red and inflamed. A larger quantity injected in a similar manner, produced an earlier death, and the inflammation was confined to the lungs; but a weaker solution took a longer period to develope itself, and the lungs and intestines were equally affected.*

Externally applied, the tartar emetic produced similar vomitings and stools, and also the same lesions on dissection.

It thus appears, that, as a general rule, its first effect is almost always vomiting, in those animals who are capable of this function, and the poison is thus thrown off in many cases, before it has had time to produce fatal consequences.

The results obtained by Mr. Brodie were similar in many respects. When applied to a wound in animals capable of vomiting, it usually, but not constantly, operated as an emetic. Paralysis, drowsiness, and at last complete insensibility, were among the symptoms that preceded death. The stomach sometimes bore the marks of inflammation, but he never saw any appearances of it in the intestines. These experiments were performed on rabbits, and the same symptoms were present, whether the tartar emetic was injected into the stomach, or applied to a wound. The deduction drawn by Mr. Brodie from these results is, that this mineral does not produce its deleterious effects until it has passed into the circulation.†

Chemical proofs. There is considerable discrepancy among chemists as to the solubility of this salt. Dr. Duncan, jun. is said to have selected very pure specimens for this examination, and he states that one part is soluble in three times its weight of water, at 212 deg. and in fifteen at 60 deg.‡ Probably it would be proper, in ordinary cases, to add rather more than these proportions.

The following are among the tests of tartar emetic:

(*a*) When heated red-hot in an earthen crucible with the black flux, it blackens and decomposes, leaving for a residue, metallic antimony, and potash slightly carbonated, of a white colour.

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* Magendie, p. 24, 36, 37. † Lond. Med. and Phys. Jour. vol. 28, p. 126.

‡ Paris' Pharmacologia, p. 195.

(b) Sulphuretted hydrogen, sulphuretted water, and the hydrosulphurets, when used in small quantities, throw down an orange-yellow precipitate, and a deep brown-red if employed in excess. This precipitate, after being dried and mixed with charcoal and common potash, gives, by the action of heat, a cake of metallic antimony.

(c) Concentrated sulphuric acid produces a white precipitate.

(d) Lime-water gives an abundant, thick, white precipitate, which is re-dissolved with facility by nitric acid. Barytic water produces the same effect as lime-water.

(e) The infusion of nut-galls in alcohol is the most sensible test of this substance in solution. It produces an abundant precipitate of a dirty white colour, inclining a little to yellow.

The juices of plants, the extractive decoctions of roots and barks, precipitate the solution of tartar emetic, and produce a reddish yellow deposit, consisting of oxide of antimony and a portion of vegetable matter. According to Dr. Paris, one ounce of the decoction of yellow bark is capable of decomposing one scruple of this salt, and rendering it completely inert.*

The application of tests to various mixtures, produce the following results :

Substances employed	Red wine ten parts, and solut. tartar emetic, 1 part.	Red wine ten parts, solut. tartar emetic, 7 parts.	Infusion of tea 10 parts, solut. tartar emetic, 1 part.	Infus. of tea. 1 parts, sol. tartar emetic, 6 parts.	Albumen, and sol. tartar emetic.	Gelatine, and sol. tartar emetic.
Effect of these mixtures on each other.	No change	No change.	Very slightly disturbed		No change.	No change.
Effects of tests on these mixtures. Hydrosulphurets	Reddish yellow precip.	Almost black.	Deepish Red.	Reddish Orange.	Same as tar. em. alone.	Same as tar em. alone.
Larger quantity of ditto.	Green p.					
Inf. nut-galls in alcohol.	Violet p.	Deeper violet.	Turbid only.	Dirty white.	Same as tar. em. alone.	Abundant precip.
Sulphuric acid.	Deep violet prec.		White pr. inclining to yellow.	White, slightly yellow.		Same as tar. em. alone.
Lime-water.					White prec. †	

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* Page 195.

† This, however, does not disappear on the addition of pure nitric acid, since the albumen forms an insoluble body.

Tartar emetic poured on milk, produces no coagulation, and the mixture gives a clear red precipitate with the hydro-sulphuret of ammonia. Broth and bile, diluted with water, do not alter the action of agents on the tartar emetic.*

These results prove the uncertainty of depending on the above tests solely. The precipitates should in all cases be evaporated to dryness, and the proper process for reduction with the black flux must then be employed.

Antidotes. Vomiting, if not already present, should be excited by tickling the throat and the administration of warm water in large quantities; and even if it has taken place, warm water is advisable to relieve the symptoms. If, notwithstanding the employment of these means, vomiting cannot be induced, we should exhibit the decoction of bark. This was proposed by Berthollet, and its value is great, from the fact of its decomposing the salt. Strong tea, the decoction of nut-galls, or of astringent roots and barks generally, will answer as substitutes when the bark cannot be obtained.†

Opium may be employed in excessive vomitings, and the antiphlogistic treatment is generally necessary to remove the secondary symptoms.

THE OXIDE AND GLASS OF ANTIMONY. These substances are also poisonous, even in small doses. Hoffman mentions fatal cases, produced by the latter, where the symptoms were similar to those caused by tartar emetic; and Morgagni quotes instances where men and animals died from its exhibition. Inflammation of the stomach was observed on dissection.‡

Both the oxide and the glass being mixed with charocal, and heated in an earthen crucible, furnish metallic antimony.

THE MURIATE (*butter of antimony*) AND SUBMURIATE OF ANTIMONY. These, like the former, are deleterious substances. Orfila quotes a case from Borrichius, where a few strong doses of the submuriate caused violent purging and vomiting, a copious salivation, and extreme debility. For some time previous to death the patient was cold as ice, his pulse was scarcely perceptible, and he breathed with difficulty. He nevertheless enjoyed all his intellectual faculties.§

These preparations may be reduced with the black flux, and the hydro-sulphurets produce a precipitate more or less red, with their solutions.

ANTIMONIAL WINE. The composition and strength of this preparation vary according to the purity of the solvent, and as this is liable to alteration, a degree of insecurity attaches to its exhibition.‖ And I have no doubt that children have often been injured by its administration without proper advice. I will only advert to the cases quoted by Orfila from Mangetus and Fabricius Hildanus, as proofs of the dangerous and even fatal effects of this substance. Certainly the solution of tartar emetic in water is a far preferable prescription.

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* Orfila, vol. 1, p. 166-7-8.

† In his latest work, Orfila gives the preference to nut-galls over all the other astringents.—Orfila's directions, p. 60.

‡ Morgagni, vol 3, p. 370. § Orfila, vol. 1, p. 190.

‖ See Paris' Pharmacologia, p. 308. *Liquor Ant. Tartarisati.* He recommends that antimonial wine be removed from the list of *officinal preparations.*

The symptoms and appearances on dissection are similar to those already mentioned. The operation of tests on wine added to tartar emetic have been already noticed, but they vary somewhat when the glass of antimony is used. The hydro-sulphurets in small quantity give a deep red precipitate, and in large, a black one; sulphuric acid, a deep yellow one, bordering on a grey, and the nut-galls, a dirty white. In our chemical investigations, we should further evaporate the liquor to dryness, and then calcine it with charcoal. Metallic antimony will be obtained.*

Other preparations of antimony, as the *kermes mineral*, the *golden sulphur of antimony*, the *crocus metallorum*, &c. are also to be deemed poisonous, if given in large doses.

ANTIMONIAL VAPOURS. Fourcroy (says Orfila) relates, that he has seen fifty persons who were seized with a great difficulty of breathing, tightness of the chest, and a dry cough, gripings and purging, ten or twelve hours after having respired the vapours of sulphuret of antimony, which had been detonated with nitre. The prolonged action of these might undoubtedly lead to serious evils.†

COPPER.

The preparations of this metal are seldom used as the instruments of crime, but they are frequently poisonous through accident; and this is owing to the circumstance of copper being extensively employed for domestic utensils.

I shall notice, first, the nature of metallic copper, and then the action of its various compounds.

METALLIC COPPER. The weight of testimony is decidedly in favour of this not being poisonous, when perfectly pure. Orfila cites several cases from authors, where masses were swallowed, and after some time voided by the natural passages, without producing any injury. Dr. Paris mentions an instance where six copper penny-pieces were taken, with a view of self-destruction, and no inconvenience was experienced, except the effects of mechanical obstruction. They were voided after a lapse of five years.‡

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* Orfila, vol. 1, p. 191-192. † Orfila, vol. 1, p. 195.

‡ Paris' Pharmacologia, p. 250. The following may seem to contradict the usual results, but its peculiarities are probably to be ascribed to some previous oxidation of the metal. "A child, aged three years, swallowed two copper farthings by accident, at an interval of half a year after each other. After swallowing the first, he eat nothing for ten days, complained of great pain at his stomach, and trivelled as if he had been salivated. After the second, he began by degrees to lose his flesh, and had the appearance of consumption. He was, however, perfectly cured by the Bath waters."—Communication by Dr. Edw. Baynard, Phil. Trans. vol. 20, p. 424. A case is also mentioned by Dr. Jackson, of Boston, where the swallowing of a half cent produced nausea and vomiting, with several other symptoms characteristic of the poison.—New-England Journ. vol. 3, p. 156.

It is not so certain that this substance, in a state of minute division, as filings for example, is equally innocuous. Portal relates a case where they were given to an individual labouring under ascites, and while the disease seemed to yield, cholic, tenesmus, and vomitings suddenly supervened.* Experiments on animals, however, with large doses of copper filings, mixed with grease or oil, have produced no injury, and on dissection, their metallic brilliancy was found untarnished.

But we have always reason to dread the effects of this metal on the human system, from the facility with which it oxidates. Copper exposed to a moist atmosphere becomes tarnished, and passes into a state of oxide, which soon after unites with the carbonic acid of the atmosphere, and forms a greenish carbonate. It dissolves in the principal mineral acids with the aid of heat. Milk, however, although boiled for two hours in a clean kettle, did not contain any trace of copper; and the same result was obtained with tea, coffee, beer, and rain-water. But if the water contained muriate of soda, it dissolved a notable portion of copper.† Fat bodies, assisted by the oxidizing principle of the atmosphere, act with celerity on it; and Proust explains the quick corrosion and destruction of the copper sheathings of vessels, from the combined action of grease and muriate of soda. Don Raphael Clavigo (he observes) ascertained this cause, and when he placed sheets of thick coarse paper between the plaster of fat and the copper, to prevent their contact, the durability of the sheathings was secured.

We must remark, however, that the vegetable acids generally dissolve copper with difficulty, even although assisted by heat. And hence, the boiling of sugar or syrups, in vessels of this metal, does not of itself produce any noxious compound, unless it be left to cool in them. In the latter case, the boiled substance acquires a bad taste and a green colour, and the copper forms an oxide on its surface.

These facts are sufficient to prove the necessity in all cases of tinning vessels intended for the preparation of articles of food. Numberless causes (says Proust) unite to accelerate the dissolution of the copper, since the juices of all viands are fat, acid, and naturally saline. It is therefore evident, that tinning is indispensable for kitchen utensils.‡ And this author has also shewn another advantage arising from this precaution. The usual alloy applied in tinning vessels, consists of equal parts of tin and lead; and the tin being more oxidizable than the lead, is exclusively dissolved by any vegetable acid that may be contained in the viands, and thus prevents the latter from being attacked. These compounds of tin are known to be harmless.*

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* Orfila, vol. 1, p. 201.

† These experiments were made by Mr. Eller, a chemist of Berlin. He also noticed a remarkable circumstance in connection with the last phenomenon. If, instead of a simple solution of muriate of soda, it was previously mixed with beef, bacon, and fish, the fluid resulting did not contain a trace of copper.—Orfila, vol. 1, p. 202.

‡ Cleanliness may, however, ward off any formidable injury. "In the Orphan House, at Halle, from 600 to 900 persons daily eat food dressed in large copper kettles, and yet I never heard there of any bad effects from them: here, however, I must observe, that the cleanliness was quite exemplary; that in the afternoon we observed, with pleasure and admiration, the kitchen perfectly clean, and the copper vessels bright.—Michaelis' Commentaries, vol. 3, p. 338.

Copper and bell-metal mortars are evidently hazardous, for similar reasons, in the office of the apothecary. Not only will moisture affect them, but also many articles of the materia medica, and thus a dangerous compound may result.†

Oxide and carbonate of copper. The carbonate (natural verdigris) forms spontaneously on the surface of copper or brass vessels, pieces of coin, &c. when treated with ammonia or water, and is of a green colour. The oxide is of a blackish brown colour. Both of them are highly poisonous, and cholic and vomiting are their usual symptoms.

From the remarks made in the previous section, it will be readily understood why copper utensils, when not properly cleaned, contaminate acid substances boiled in them. Vinegar dissolves the oxide with ease, as does also ammonia. Eller has proved that wine dissolves copper, doubtless in consequence of the acetic acid contained in it, and the oxidation of the metal by the air.‡ And we can explain, in the same way, the production of the acetate in the cocks of vessels from which wine, beer, or cider is drawn. "Drouard was affected for three days with cholic and diarrhœa, in consequence of eating a ragout which had been seasoned with wine drawn out of a cask, the cock of which contained acetate of copper, which this liquor had in part dissolved." Fat bodies, such as fixed and essential oils, &c. dissolve the oxide and carbonate of copper with readiness, and hence Proust very justly condemns the use of copper measures for oil.§

The tests of these compounds are similar to those of verdigris, which we shall now notice.

Verdigris. The compound substance known under this name, is, the preparation of copper which most frequently produces deleterious effects. Orfila has collected numerous cases illustrating its action, and I conceive it will be useful to state the mode in which the respective individuals were poisoned. In one instance, a family, consisting of nine persons, were affected; the first of these by a cake made with melted butter, and skimmed with an instrument of copper, upon which the fat body had been allowed to cool; five from some broth and meat coming out of a saucepan, skimmed by the same skimmer; and the remainder by a fricasee of pigeons, prepared in the same pan. The Jacobin Friars in Paris, to the number of twenty-one, were poisoned in 1781, by eating some ray, which had been cooked in a copper vessel. The cook, after taking out a part of the water, had poured vinegar on the fish to render them more firm, and in this state they had stood for some time, away from the fire. Some veal placed in an earthen pot, to which there was a copper lid, and which lid laid directly on the meat, affected two individuals. So, also, eggs prepared with sorrel and butter, in a copper vessel, which was covered with verdigris. Dupuytren mentions a case where a whole family was poisoned from eating lobsters, which had been cooked, and afterwards placed in a copper kettle, with vinegar poured over them. Even pease, which remained for a day in the copper vessel, have produced all the characteristic effects of poisoning from copper.*

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* Mr. Proust's papers on *Tinning*, which appeared originally in the *Annales de Chimie and Journal de Physique*, I have consulted in the Repertory of Arts, second series, volumes 6 and 9.

† There is a useful paper on this subject in the Medical Commentaries, vol. 7, p. 311. The author first shews that bell-metal mortars are liable to abrasion, and that thus the particles may be united with medicines; and next, that some substances will act chemically on them.

‡ Moseley relates, that, in 1592, at a meeting of the great senate of Bern, the wine was put into copper vessels, and suspended in a well, in order to cool it. In a few days, the legates and others who had drank were seized with violent pain in the abdomen, fever, and dysentery, and many died.—Moseley on Tropical Diseases, p. 381.

§ Orfila, vol. 1, p. 203 to 206. In several cities in Europe, distillers, apothecaries, and others, are forbidden to use copper vessels, unless they are tinned.—Ehrmann in Schlegel, vol. 3, p. 230.

Verdigris itself is also sometimes used as the instrument of suicide.†

It is not necessary to copy the detail of any particular case, since the leading symptoms in all are generally very similar. They are thus stated by Orfila: "An acrid, styptic, coppery taste in the mouth, parched and dry tongue; a sense of strangulation in the throat, coppery eructations, continual spitting, nausea, copious vomitings, or vain efforts to vomit, shooting pains in the stomach, which are often very severe; horrible gripes, very frequent alvine evacuations, sometimes bloody and blackish, with tenesmus and debility; the abdomen inflated and painful; the pulse small, irregular, tight, and frequent; syncope, heat of skin, ardent thirst, difficulty of breathing, anxiety about the præcordia, cold sweats, scanty urine, violent head-ache, vertigo, faintness, weakness in the limbs, cramps of the legs, and convulsions." All these, however, do not generally occur in the same individual, but vomiting and cholic are very constant.‡

Gangrene sometimes takes place in the intestines, and this disease is then accompanied with its usual premonitory appearances.

Appearances on dissection. The alimentary canal is the organ principally diseased. When death ensues within a few hours after taking the poison, the mucous lining of the stomach and intestines is found to be inflamed and gangrenous, and this extends even to the rectum. In one instance, that intestine was found pierced at two points. Sometimes the inflammation extends to all the coats, and sloughs are formed, which leave openings, through which their contents pass out, and are effused into the cavity of the abdomen.* Metzger remarks, that the green colour of the salt tinges all the fluids contained in the primæ viæ.† Inflammation of the brain has occasionally been noticed.‡

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* Medico-Chirurg. Review, vol. 1, p. 158, quoted from a French Med. Journal.

† See Metzger, p. 396, who quotes a case from Pyl. The verdigris was found in the pylorus, and it had tinged the fæcal matter.

‡ Hiccup was a constant symptom in a fatal case witnessed by Dr. Percival.—Trans. College Phys. London, vol. 3, p. 80. The cause was an immoderate use of pickled samphire, impregnated with copper. A rash on the surface of the body has also been observed in some cases.

Effect on animals. The experiments of Drouard on dogs, led him to the conclusion, that verdigris acts immediately on the alimentary canal, in which it excites inflammation, without being taken up into the circulation by the lymphatic vessels. To a young dog, twelve grains were given, which produced death in twenty-two hours. The stomach was found inflamed, and exhibited a black spot, which might have been taken for an erosion. The small intestines showed no marks of inflammation, but the rectum contained small ecchymoses, similar to those in the stomach. In another instance, the stomach and duodenum were inflamed, and the rectum natural.

When a small quantity in solution was injected into the jugular vein, death ensued in half an hour. The trachea and bronchiæ were filled with frothy mucosities, and the great vessels were distended with black and fluid blood. But in a dog who survived to the fourth day after this operation, nothing peculiar was observed either in the digestive organs or the vessels. Large doses indeed seem to produce sudden death, preceded by vomiting, convulsive motions, great insensibility and paralysis, and present at the same time but slight alterations on dissection. Orfila considers these facts as invalidating the doctrine of Drouard, and conclusive in favour of the absorption of the poison, and its action on the nervous system.§

Chemical proofs. *(a)* Sulphuric acid poured on the verdigris in powder, decomposes it with effervescence, and vapours of acetic acid are disengaged. But it must be recollected, that no such effect is produced with natural verdigris, (carbonate.) Here acetic acid should be poured on it, and the subsequent tests applied.

(b) Sulphuretted hydrogen decomposes it, and precipitates a black sulphuret of copper. This is said by Sylvester to be a very delicate test.

(c) A clean plate of iron immersed in the solution, becomes covered in a few hours with a portion of the copper, and the blue colour of the solution grows first green, and then turns to red.

(d) Caustic potash precipitates it of a sky-blue colour, and in larger quantities, of a deep blue. The sub-carbonate of potash likewise gives a sky-blue precipitate.

(e) Ammonia gives a blue precipitate, but if added in excess, the precipitate re-dissolves, and the liquor is of a beautiful blue colour.

(f) Arsenious acid in solution gives an abundant green precipitate.

(g) Chromate of potash, a yellow precipitate.

(h) The triple prussiate of potash and iron in solution, gives a brown

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* Orfila, vol. 1, p. 224. † Metzger, p. 131. ‡ Male, p. 147.

§ Vol. 1, p. 212 to 216.

precipitate. When very diluted, it will only produce a red colour in the mixture, without any turbidness, but at the end of about twenty minutes, the brown precipitate will fall. This is one of the most minute tests of copper.

(*i*) If the suspected substance be in powder, it should be mixed with charcoal and heated to redness in an earthen crucible. Metallic copper will be formed. The same process is proper, when the fluid is combined with substances which prevent the action of tests. Evaporate it to dryness, and then calcine with charcoal.

The following are mentioned as the effect of animal and vegetable substances on it. The infusion of tea decomposes the solution of the acetate of copper, and a flaky precipitate of a reddish yellow-colour is produced. If one part of a concentrated solution of verdigris be added to ten parts of red wine, the liquor preserves its transparency and the hydro-sulphurets give a black precipitate; the prussiate of potash a brown, and ammonia a very dark brown. Seven parts of the solution of verdigris and ten of wine furnish a fluid with which the above agents produce similar results, except that the precipitate from the ammonia is of a black colour. It readily follows from these, that this alkali is of no use in detecting verdigris if it has been mixed with wine.

If albumen be poured upon the acetate of copper, a bluish-coloured precipitate will be obtained. Gelatine produces no effect, whatever may be the temperature of the mixture, and the tests act exactly as if the acetate of copper were alone. Broth furnishes no precipitate, but milk is coagulated by a large quantity of the solution of verdigris, and the coagulum, when properly washed, is of a deep green-colour. Sugar by trituration with verdigris renders it nearly insoluble in cold water.*

In certain cases, however, no vestige of the poison can be detected, from its having been vomited up during life. Orfila recommends that we should then scrape off the mucous membrane of the stomach and intestines, dry it, and submit it to the action of strong heat in a crucible. He has twice, he observes, obtained metallic copper, by calcining in this manner a portion of the membranes of two dogs, poisoned by verdigris, and this effect particularly takes place when the mucous membrane is of a bluish-colour, hard and strongly adhering to the substance of the stomach.†

Antidotes. The investigation of M. Marcelin Duval, and the earlier experiments of Orfila, seemed to prove that *sugar* was the antidote for verdigris. It allayed the pain and other alarming symptoms, and produced a great number of liquid stools.‡ Subsequent researches have however diminished the value of this substance. It is useful in calming the irritation, when the poison has been expelled by vomiting, but it exerts no chemical action on it, and animals on whom the œsophagus was tied, died notwithstanding large doses of syrup were administered. When *albumen* was given under similar circumstances, the animal survived several days, experienced no remarkable change, and after death no lesion was found.[*] It is hence the proper antidote, while sugar and its preparations may be used to aid its operation.

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* Orfila, vol. 1, p. 206 to 211. † Ibid. vol. 1, p. 231.

‡ A late case is recorded in the Medico-Chirurg. Review, vol. 1, p. 158, Amer. Edit. where sugar apparently saved the life of the patient. After the second draught of sugar and water and whites of eggs, the vomitings and epigastric pains ceased; he fell asleep, and awoke quite well.

Should any inflammatory symptoms remain after the presumed evacuation of the poison, they should be treated like gastritis, and opium and antispasmodics may be indicated for the spasmodic affections that are apt to remain.

The *acetate, sulphate, muriate, nitrate, and ammoniaret of copper*, are all poisonous to the human system, and they are to be detected by most of the tests already enumerated, but most decisively by the reduction of the metal. So also with coppery wine or vinegar. The tests here are uncertain, and the only mode left, is to evaporate to dryness, and calcine the residue with charcoal, in order to obtain metallic copper.

ZINC.

The SULPHATE OF ZINC, from its frequent use in medicine, may, by accident, be taken in improper doses. Its property, however, of readily exciting vomiting, will prevent, in most cases, any very serious consequences. In the experiments of Orfila, he found that when given to dogs in large doses, it caused frequent vomitings, but they recovered in a short time. When, however, a solution of it was injected into the jugular vein, violent and often ineffectual attempts were made to vomit, and death followed in a few minutes. So also when the œsophagus was tied; the animal died on the third day, and on dissection the mucous membrane of the stomach was found of a deep red-colour throughout its whole extent, and black spots were occasionally seen upon the muscular coat, from extravasated blood. The lungs were less crepitating than usual, and their colour was rather dark.

Cases are also recorded of its effects on the human system. In a female, who by accident drank down a solution of two ounces, it produced an excessively astringent taste, a contraction about the throat, burning heat at the stomach, cold extremities, pale countenance, and convulsive pulse. Vomiting, however, soon intervened, and by the aid of proper remedies, the consequent irritation of the nervous system was subdued. In another case, violent pain in the epigastric region came on and was succeeded by vomiting and continual stools. These gradually diminished and he recovered.[†]

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[*] Orfila, vol. 2, p. 466.

[†] Orfila, vol. 1, p. 570. " A female partook accidentally, and very moderately, of a cake impregnated with white vitriol, which had been prepared for the destruction of an old man. He was seized with violent vomiting, but the woman died."—Ballard, p. 396.

From these cases we may consider the following as the chain of symptoms which will result from taking this salt in large doses: "an astringent taste, sense of strangulation, nausea, copious vomitings, frequent stools, pains in the epigastric region, extending afterwards over the whole of the abdomen, difficulty of breathing, frequency of pulse, paleness of the countenance, and coldness of the extremities."

Appearances on dissection. I cannot find any examination made after death on the human subject; but it is probable, from the dissection of animals, that there would hardly be any thing observed, except an inflammation of the membrane with which the salt had come in immediate contact.

Chemical proofs. Sulphate of zinc is very readily soluble.

(a) Potash and ammonia precipitate from it a greenish-white oxide, easily soluble in an excess of the latter alkali.

(b) Prussiate of potash causes a deep-blue precipitate.

(c) The hydro-sulphurets, a blackish one.

(d) Chromate of potash, an orange-yellow.

(e) The precipitates should be evaporated to dryness, and they or the solid substance found, may be mixed with caustic potash and charcoal, and then reduced by a high heat. Metallic zinc is obtained, after a considerable interval.

Gall nuts and an infusion of tea produce a deep violet-blue precipitate; Burgundy wine, and water saturated with sugar, occasion no change: but albumen and gelatine give a white precipitate, and bile a yellow one. Milk is curdled by a tolerably large quantity of this solution.*

Treatment. We should endeavour to promote vomiting by administering warm water and emollient drinks. Milk is particularly proper, from its power of decomposing the sulphate. We must guard against the approach of inflammation, and allay irritation by anodynes.

OXIDE OF ZINC. This can hardly be considered a very deleterious substance. In large doses, it produced vomiting in animals, and probably would have the same effect on the human system.

It is a problem of considerable interest, whether METALLIC ZINC is a safe substance for domestic utensils. It has been repeatedly recommended for this purpose, by individuals on the continent of Europe, but the examinations made by chemists are decidedly unfavourable to it. Proust suggests several objections with reference to its manufacture, such as the effect of heat on it, and the difficulty of soldering; but the most important is its facility of oxidation. The atmosphere alone produces this effect, while vinegar dissolves it and forms an acetate.† Several commissions have been appointed in France to examine into the propriety of employing this metal. Vauquelin and Deyeux reported to the medical faculty of Paris, that water, when suffered to remain in vessels of zinc, decomposed it, and produced a white oxide. Vinegar caused an acetate, which was ascertained by re-agents. Citron-juice and sorrel each produced, on boiling, their respective compounds with the metal. Muriate of soda in solution furnished a liquor which gave a precipitate of oxide of zinc. Lastly, butter heated in a saucepan of zinc destroyed the polish of the vessel, and there was even formed by the heat a small hole in the bottom of it. It is therefore impossible, (they remark) to employ it for kitchen utensils, without incurring the hazard of its being united, either in the state of oxide or salt, with domestic viands.*

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* Orfila, vol. 1, p. 265-266.

† See Proust's paper, already quoted.

The French Institute also appointed a committee, at the request of the ministers of the interior and of war, to enquire into the propriety of its use for the fabrication of measures for liquids, and for vessels and utensils for the use of military hospitals. It consisted of Portal, Berthollet, Deyeux, Vauquelin, and Guyton Morveau. They repeated several of the previous experiments with similar results. Even distilled water, heated in a sand-bath, dissolved part of the zinc, and formed a hydrate, which possessed a distinct metallic taste.

The commission remark, that although the oxide itself may not be dangerous, yet if zinc-vessels be used for domestic purposes, we shall have a variety of salts produced from the numerous ingredients that are employed for food. And it is impossible that these can be healthy; nor indeed can it be otherwise but that some will prove noxious. They therefore advise against the adoption of this metal.†

TIN.

In its metallic state, this substance is not poisonous; but a preparation much used in the arts is highly deleterious, viz.

THE MURIATE OF TIN. Three quarters of a grain dissolved in two drachms of water, and injected into the jugular vein of a small dog, produced a species of catalepsy, which gradually passed into complete paralysis and insensibility, and death followed in twelve hours after the application. Two grains, injected in a similar way, destroyed the animal in fifteen minutes—tetanic convulsions preceded the termination. Lastly, six grains caused vertigo and death in one minute after the injection. On dissection, the lungs were found more or less shrivelled, and partially gorged with blood; the blood itself was dark-coloured, and there was a slight redness of the mucous membrane of the stomach and duodenum. When muriate of tin was introduced into the stomach, it excited violent vomiting and death, without convulsions or paralysis. The mucous membrane of the stomach, on examination, appeared of a dark-red colour, was hardened, horny, and, as it were, tanned. It was also ulcerated in various parts, and the intestinal canal contained much black, thick, ropy bile. The lungs were sound.

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* Repertory of Arts, second series, vol. 23, p. 178.

† Repertory of Arts, second series, vol. 25, p. 247, 313. A third report was made some time previous by Chaussier, Gay, Lussac, and Thenard, on the question whether *canteens of plated zinc* were advisable for the French armies. They state, among other results, that common wine, vinegar, and even mixtures of vinegar and water, dissolve the metal, and give out hydrogen. The plating of zinc-vessels internally with tin has been attempted, but it was abandoned, from the acrid and disagreeable flavour given to the meat; and they add, that tin does not appear capable of coating zinc in such a manner as to guard it against the action of acids. Lastly, plates of zinc, when soldered together, have too little solidity, and are apt to give way. They therefore gave a decided opinion against the introduction of either plated zinc or tinned zinc, for the above purposes.—New-York Med. Repository, vol. 17, p. 88.

There are no cases on record, I believe, of death being produced on the human subject by the use of this substance; but from a narrative given by Orfila, as to the effect of a small quantity taken by accident in food, it is evident that it may prove highly deleterious. Cholic was produced in all the individuals, and diarrhœa accompanied this in two of them.

Among its *tests* are the following;

(a) The addition of corrosive sublimate in solution produces a white precipitate.

(b) The muriate of gold, a purple precipitate.

(c) The hydro-sulphurets render it turbid, and separate from it a blackish powder.

(d) The prussiate of potash causes a white precipitate, which soon becomes blue on exposure to the air.

The action of the muriate of tin on animal and vegetable fluids, is very distinct and powerful.

A strong infusion of tea, and the infusion of gall-nuts in alcohol, give an abundant precipitate, of a clear yellow colour. A small quantity of the muriate dropped into Burgundy wine, produces a violet coloured sediment. Albumen precipitates it of a white colour. Gelatine decomposes it, and produces a white flaky precipitate. Milk is converted by a few drops into thick curds, which, on being dried, are of a yellow colour, and friable. Human bile added to it, produces flaky curds.

Simple syrup (water saturated with sugar) seems to be the only substance that does not occasion any change in the solution.

These results invalidate the importance of tests, and it is therefore proper, in all cases, according to Orfila, to dry the precipitates, and calcine them in a crucible with caustic potash. Metallic tin will be produced.

Antidote. It is evident, from the experiments of Orfila, that *milk* acts as an antidote to this poison. It is completely coagulated, and the coagulum contains muriatic acid and oxide of tin, and is not deleterious. The antiphlogistic treatment may be subsequently necessary, if symptoms of inflammation supervene.*

The *oxide of tin* has also proved destructive to animals who have been made to swallow it.

SILVER.

Nitrate of silver. (*Lunar caustic.*) A small quantity of this salt in solution, injected into the jugular, produced difficult respiration, the appearance of suffocation, efforts to vomit, pain, convulsions, and death. On dissection, the lungs were seen of a rose colour, the heart was distended with blood, and, in one instance, the mucous membrane of the duodenum was of a bright cherry red. When the œsophagus was tied to prevent vomiting, and twelve grains in the solid form were introduced into the stomach, death followed in six days, without any previous symptoms, except debility, intense thirst, and frequency of pulse. The mucous membrane was perforated in a number of places, with small scars, of the size of a pin's head. The lungs were, however, sound. Again, twenty grains in solution were administered to a dog, and produced only uneasiness and dejection. On the third day thereafter, thirty-two grains more were given, which caused vomiting of a pulpy matter. Of this he again recovered. On the fifth day the œsophagus was tied, and thirty-six grains introduced. It was followed by excruciating pain, and he died on the night of the succeeding day. The examination after death presented the mucous membrane of the stomach dissolved into a pulp, and eschars of a greyish white colour were seen near the pylorus. The muscular coat was inflamed, but the lungs were healthy.

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* Orfila, vol. 1, p. 247 to 261.

There are but few instances on record of injury done by the nitrate of silver to the human subject. Orfila relates from Boerhaave, that a student of pharmacy swallowed some lunar caustic, and excruciating pains, gangrene, and sphacelus, were the consequences; and Metzger alludes to a case, where the most imminent danger followed, from a surgeon letting a piece drop into the throat of a patient, whose ulcers he was touching with it.* Its effects on the skin are, an illustration of its probable operation on the throat, stomach, &c.

Tests. (*a*) When thrown on burning charcoal, it is decomposed. Vapours of nitric gas are given out, and the metallic silver remains upon the charcoal.

(*b*) The solution stains the skin black.

(*c*) Muriatic acid, and the soluble muriates, precipitate the corneous muriate of silver, which is white and curdled.

(*d*) Potash, soda, and lime-water produce a deep brown precipitate. Ammonia produces no turbidness.

(*e*) The hydro-sulphurets give a black sediment.

(*f*) Arsenious acid causes a yellow precipitate, which, on exposure to the air, becomes black.

(*g*) Phosphate of soda produces a yellow precipitate.

(*h*) Prussiate of potash, a white precipitate.

As to the effects of nitrate of silver on animal or vegetable substances, the following may be noticed:

The alcoholic solution of gall-nuts produces no change.

If ten parts of Burgundy wine be added to one of a solution of nitrate of silver, the fluids become slightly turbid, and acquire a violet colour. The muriatic acid produces a white precipitate of this mixture, the hydro-sulphurets a greenish brown, and the phosphate of soda a violet blue.†

When fifteen parts of an infusion of tea are added to two parts of a solution of nitrate of silver, a flaky precipitate occurs, of a deep purple-red, bordering a little on black. If one part of nitrate of silver was employed, the mixture was of a yellow colour, but passed first to a red and then to a black colour, without affecting its transparency. In this state, muriatic acid gave a yellow sediment.

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* Metzger, p. 397.

† Chlorine will not answer as a decolourizing application in this case, as it decomposes the nitrate.—Orfila, London Med. Rep. vol. 14, p. 509.

Albumen gives a copious white precipitate, broth a yellowish-white one, and bile an orange-yellow one. Gelatine causes no change. Milk is coagulated; a formation takes place of small white curds, and the fluid becomes transparent.

Antidote. Muriate of soda appears, from the experiments of Orfila, to counteract the effects of nitrate of silver. It produces an insoluble muriate, which has no power on the system. Hence, salt-water, aided by emollient and mucilaginous drink, is advisable.*

FULMINATING SILVER, according to the experiments of M. Pagot Laforet, also acts as a violent poison on animals in small doses. But if charcoal, mixed with water, was administered in quantity immediately after the exhibition of the poison, the symptoms ceased, and no further injury was sustained.†

GOLD.

NITRO MURIATE OF GOLD, injected into the jugular of animals, produced death, apparently by causing suffocation. The succession of symptoms were vertigo, deep respiration, plaintive cries, and occasionally vomiting. They expired in a few minutes after the operation. On dissection the lungs were seen gorged with blood, the heart was full of black blood, but the mucous membrane of the stomach and intestines was sound.

Death also followed from taking this substance into the stomach, and the mucous membrane was, on dissection, found abraded in several places.

We have no cases on record of poisoning by this salt; but it is evident, from the preceding observations, and also from its effects as an article of the materia medica, that it exercises a powerful action on the human system. It has come within my observation, to have seen a case of dropsy removed by its use in a very short time.

Tests. (*a*) When thrown on burning charcoal it is decomposed, and converted into metallic gold, and the chlorine is given off.

(*b*) It stains the skin of a purple colour.

(*c*) Sulphate of iron produces a brown precipitate, and pellicles of gold are seen floating on the surface of the fluid.

(*d*) Muriate of tin produces a purple precipitate.

(*e*) The hydro-sulphurets cause a deep chocolate-coloured precipitate.

(*f*) *The prussiate of potash produces no effect.*

Effects of animal and vegetable fluids. Muriate of gold is not affected by syrup; is precipitated reddish-yellow by tea; red, chocolate-coloured, and afterwards metallic, by tincture of galls; deep-purple and metallic by Burgundy wine; yellow by albumen and gelatine; and green, passing into purple and violet, by bile. It also instantly curdles milk.* Chlorine decolourizes the mixture with wine, and leaves the tests to operate in their usual manner.

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* Orfila, vol. 1, p. 274 to 287.

† London Med. and Phys. Journ. vol. 25, p. 457, quoted from the *Journal General de Medicine.*

Antidotes. Dr. Thomson recommends the sulphate of iron for this purpose, from its property of decomposing the salt, and throwing down the gold in its metallic state.† Orfila recommends the antiphlogistic treatment generally, and in particular the use of emollient and mucilaginous drinks.

FULMINATING GOLD appears to have proved highly deleterious in several cases quoted by Orfila from Plenck and Hoffman. Vomiting, spasm, diarrhœa, faintings, and death, were the consequences of the administration of a few grains, (three to six.) Rivinus mentions having found holes in the intestines of a child poisoned with it.‡

PLATINA.

I conceive that there can be but little doubt that the *nitro-muriate of platina,* if taken internally, would prove a violent poison. Being, however, a rare article, and confined to the laboratory, it does not require a minute notice; but the following fact is curious, and deserving of attention. "A person has been uniformly affected with erythema of the face, during the last six or seven years, every time he opens a bottle containing the liquid nitro-muriate of platina, within two or three feet distance, and without touching the face. The same effect is produced by opening a bottle containing dry ammonia, or oxide of platina. If the smallest particle of these substances be brought into contact with the face, even the fingers, though they be carefully wiped after touching these preparations, if they come in contact with the face, the erythema is excited. It spreads rapidly over the skin of the face, feeling very hot, itching extremely, and causing a pale rose-red colour. In two, three, or at most four hours, this slight disease disappears."§

BISMUTH.

Nitrate of bismuth, in its chrystallized state, was boiled in distilled water, and the fluid afterwards filtered. When this was injected into the jugular vein, it produced retching, plaintive cries, convulsions of the limbs, palpitation, difficulty of breathing, and general depression and death. The lungs were dark-coloured, but tinged only in particular parts, or wrinkled. The left ventricle and arteries contained only a little black blood. The *subnitrate of bismuth,* on being introduced into the stomach, produced a vomiting of white ropy matter, deep and difficult respiration, trembling of the limbs and death. The mucous membrane of the stomach was either highly inflamed or extensively ulcerated, so that the slightest friction separated it in the form of pultaceous scraps. Portions of the lungs were gorged with blood.

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* Orfila, vol. 1, p. 288 to 296.

† Annals, vol. 5, p. 385.

‡ Orfila, vol. 1, p. 297.

§ Edinburgh Med. and Surg. Journal, vol. 8, p. 524.

When the white oxide of bismuth has not been prepared with sufficient care, it often happens, that violent vomiting, diarrhœa, and other unpleasant symptoms, will ensue from its administration. And I venture to suggest, that the instances mentioned by practical writers have arisen from this cause. In one case, where the precipitate produced by adding water to the nitrate did not undergo the repeated washings which are necessary, I have known it to cause the most alarming vomiting. It is certainly not yet established, that the white oxide, when pure, will cause any injurious effects.

Tests. (*a*) Sulphuretted hydrogen causes a black precipitate.

(*b*) The prussiate of potash, a pale yellow.

(*c*) Ammonia causes a white precipitate.

(*d*) The chromate of potash, a beautiful orange-yellow.[*]

(*e*) The tincture of galls, a flaky pale yellow.

(*f*) On the addition of water, the fluid becomes milky, and a white precipitate gradually subsides.

(*g*) The precipitates, on being calcined with charcoal in a crucible, give out the metal.

Nitrate of bismuth is precipitated pale yellow by tea, yellow by bile, and white by albumen and milk. The last is curdled by it. Gelatine is not affected. Burgundy wine gives a rose-coloured precipitate, inclining to violet. The supernatant fluid preserves the red colour of the wine, but the hydro-sulphurets, on being poured into it, produce a black precipitate.[†] Ammonia deprives it of its colour, without occasioning any sensible white precipitate.

Antidotes. Milk, and mucilaginous drinks; and, if symptoms of inflammation supervene, the antiphlogistic regimen.[‡]

IRON.

Sulphate of Iron. This salt has proved an active poison to animals in the hands of Dr. Smith. When applied in the dose of two drachms, to the cellular texture of the inside of the thigh of two dogs, it killed them in the course of twelve or fifteen hours. On dissection, the internal surface of the stomach of one of them was found covered with a multiplicity of petechial spots. The wrinkles of the rectum were numerous and black; the liver whitish, with livid spots on its convex surface; while the heart contained black grumous blood, and its ventricles had some slight livid blotches.

When introduced into the stomach in the dose of two drachms, it did not destroy life in less than twenty-six hours, and without any other apparent symptom than a general insensibility; the interior of the stomach exhibited red spots; the small intestines presented blackish puffy swellings, and the upper part of the rectum shewed red folds.[§]

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[*] So also, says Dr. Cooper, does corrosive sublimate with chromate of potash.

[†] On the addition of chlorine, the mixture is rendered colourless, and the tests produce their ordinary effects.—*Orfila.* Lond. Med. Repos. vol. 14, p. 409.

[‡] Orfila, vol. 1, p. 298 to 307.

[§] Orfila, vol. 2, p. 168.

LEAD.

This metal differs materially from those we have already noticed, in its effects on the system. It frequently produces a constriction of the intestines, and hence has been styled an *astringent* poison, whilst the others have been characterized as *corrosive* or *acrid* ones. We shall, however, find that inflammation is not an uncommon consequence from its exhibition, and in his last work, Orfila arranges it among the corrosive or irritating poisons.

I shall notice some of the compounds.

Acetate of lead. There are but few cases recorded of poisoning by this substance. The following, however, is related in a late publication. It occurred in the person of a soldier, who drank a considerable quantity of the solution. He was soon seized with the most violent symptoms, indicative of gastric inflammation. A sense of suffocation, drawing in of the belly, costiveness, cold and clammy sweats, and trismus, were present. He died in great agony at the end of three days. On dissection, the lead was discovered by proper tests in the fluids of the stomach. The mucous membrane of that organ was abraded in several places, particularly near the pylorus; and the œsophagus, stomach, duodenum, mesentery, liver, and spleen, were in a state of high inflammation.*

Dr. Shearman has also observed fatal effects to follow from an adulteration of gin with sugar of lead. The symptoms were, occasional violent cholic pains, chiefly occurring after meals, attended with an obstinate costiveness; and, although these were for a time relieved, by purgatives and other means, they almost universally recurred. The progress of the disease, he observes, even in those cases where it attained its utmost violence, was in almost every instance so insidious and slow, as to leave the observer unapprehensive of its true character, which, however, was at last brought to light.†

Instances are, however, stated, where this salt in quantity has not produced any injurious effects. An apprentice of a cooper, near Glasgow, had an ulcer on the tibia, accompanied with considerable inflammation, for which he was ordered a poultice with acetate of lead. As this article is much used by linen printers he procured, in an adjoining print-field, a lump, which could not have weighed less than a pound, being, as he said, of the size of his fist. On coming down, he laid it on the kitchen-table, and shortly after went away. His mistress, an old short-sighted woman, soon came with cabbage for the family dinner—laid it on the table upon the lead, without perceiving it, and cut them down with a knife. By this operation both were incorporated into one mass, and the whole was put into a pot boiled with potatoes, and afterwards chopped together for dinner. This dish was eaten by the master and mistress, their daughter and her husband, and two apprentices. Soon after, the lad wished to prepare his poultice, but the materials could not be found. As a curious taste had been observed by all of them in their food, they became alarmed, and on examining the table, it was evident that the sugar of lead and the cabbage had been bruised together, as some of the former, in a powdered state, still adhered to it. Mr. Hunter, of Dumbarton, was immediately sent for. He gave to five of them an emetic, which operated well, and they experienced no disagreeable symptoms afterwards. The sixth person, an apprentice, refused to take any thing, as he felt no uneasiness, nor did he subsequently experience any disorder in his bowels.*

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* Transactions Coll. Phys. London, vol. 6, p. 39. Case by Dr. Kerchkoffs. The editors of the London Med. Intell. in remarking on this case, observe, that they once saw a gentleman die with similar symptoms, after swallowing about three ounces of solution given to him by a quack for an injection.—New-England Journal, vol. 10, p. 86.

† Edinburgh Med. and Surg. Journal, vol. 8, p. 213, from Trans. Med. Soc. London.

I may add to the above, that I have known a drachm taken by mistake, without producing any ill effects. And I was at one period disposed to attribute the exemption in these instances, to the absence of sulphate of lead, with which, it is well known, the acetate of lead of commerce is often adulterated. The experiments of Orfila on animals, (which I shall presently state,) however, sufficiently establish the poisonous nature of the acetate, even if we had not instances of it on the human subject, and we must, therefore, ascribe the escape in these cases to accident, constitutional strength, or some fortunate state of the stomach and bowels.†

I have too often witnessed the value and efficacy of acetate of lead in pulmonary and uterine hæmorrhages, not to feel a great partiality for it as an astringent medicine. I know of nothing that can be substituted, in extreme cases. But I must stop here, and unequivocally condemn the practice which has occasionally obtained of late years, of administering this salt in diarrhœa. It is not necessary, at this time, to point out the reasons why it must prove injurious—it is sufficient to say, that death preceded by all the symptoms of acute poisoning, has been the consequence of its exhibition. We have the authority of my friend Dr. Mann, late hospital surgeon in the United States army, in asserting, that during the war of 1812, several officers of rank fell victims to its use.‡

Effects on animals. When a solution of the acetate of lead, containing from one to three grains, was injected into the jugular of dogs, it did not appear to incommode them. Once or twice only, the animals made some slight efforts to vomit, and threw up a small quantity of whitish stringy matter. Five grains did not at first appear to produce any effect; but on the third day, the animal became dejected and refused to take food. On the fourth his gait was unsteady and difficult, his posterior extremities occasionally exhibited some convulsive movements, and he was extremely weak. He died on the fifth day, and the lungs and stomach were found healthy. Thirteen grains injected in this way, produced instant death, without any signs of pain or convulsions. The blood in the left ventricle was fluid, and of a vermillion-red colour.

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* London Med. and Phys. Journal, vol. 9, p. 173. Case by Mr. Hunter, of Dumbarton.

† He seems also to have shewn, that sulphate of lead is innoxious. See vol. 1, p. 485.

‡ New England Journal, vol. 11, p. 19.

When the acetate was taken into the stomach in a solid form, and in doses of from three drachms to an ounce or more, it excited vomiting, dejection, and death. The mucous membrane of the stomach was inflamed, and spots of a dark colour were observed on it; the intestinal canal and lungs were healthy. Its effects, when given in solution, were a loss of muscular power, trembling of the limbs and vertigo. The mucous membrane was of a grey ash colour.*

As the chemical proofs of all the preparations of lead are in many respects similar, we shall notice them at the conclusion of this article.

Carbonate of lead, (*cerusse or white lead.*) We have a remarkable case on record, of the noxious effects of this substance on the human system.

Mr. Deering, a surgeon in London, was requested, on the 21st of October, 1808, to visit Mrs. R. the wife of a respectable tradesman in Aldersgate-street, who complained of violent pain in the scrobiculus cordis, with great soreness of the epigastric region when pressed upon. She had vomited a considerable quantity of bilious matter, and, at the same time, her bowels were constipated; the pulse was calm and regular, the tongue clean and moist, and there was no symptom of fever present. A cathartic was administered, which operated, and an opiate given in the evening. The following morning she appeared relieved; but in the evening, the pain and vomiting recurred, and these symptoms continued for some successive days, in so distressing a degree, that it was deemed advisable to consult the family physician, which was done on November 4, 1808. At this time these symptoms continued as already intimated, without any appearance of fever, and hence the physician was induced to consider the affection as of a rheumatic and spasmodic nature.

In a few days, in consequence of the amendment of the patient, he discontinued his visits. In about a week after this period, a boy in the same family, nearly sixteen years of age, was seized with symptoms exactly similar to those of the preceding case, and similar remedies afforded only partial relief, till at length he was removed into the country, and thereby recovered his health.

A week after the attack of this youth, the eldest child, a boy six years old, was also seized with analogous symptoms, and the mother having relapsed into her former state, the physician was again consulted on the 19th of November. At this time, three other persons in the family laboured under similar affections, and suspicions were now entertained that some poisonous substance might have caused this general indisposition of the family; but after minute investigation, no one circumstance was discovered to confirm this suspicion, or to elucidate the source of so extensive a calamity.

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* Orfila vol. 1, p. 457 to 461.

The sickness and pain continued unabated in Mrs. R., but the son, after the period of a fortnight, was deemed in a state of convalescence by his physician, who discontinued his attendance; he was, however, soon after seized with convulsions, and expired within a few hours. Unexpected and severe as this shock was, Mrs. R. afterwards gradually grew a little better. She had hitherto continued to suckle her child, which, it being fifteen months old, she was advised to wean; to this she reluctantly consented. In about ten days afterwards the child became somewhat costive, without any other apparent indisposition; but, at this period, it was seized with vomiting and convulsions, and suddenly expired. The unhappy parent now experienced a return of her complaints, and, under a persuasion of the inefficacy of professional aid, she was prevailed upon to consult an empiric, whose attendance, though continued to the end of the year, proved unavailing; and, on the 3d of January, 1809, she had the advice of Mr. Chevalier, an experienced surgeon, who considered the patient's complaint to be chronic rheumatism; and, by the use of clysters of warm water, oily mucilaginous medicines, fomentations, and vesicatories, she appeared to experience more relief than at any period since the first attack; but, although the vomiting and sickness were less violent and frequent, the pain and soreness of the abdomen, first complained of, never entirely subsided; she was, however, able to sit up and amuse herself with a little needlework, and go about the domestic concerns of the family, and Mr. Chevalier had proposed to pay his final visit on the 21st. On the morning of this day she rose at ten o'clock, and within the space of an hour afterwards, whilst standing near the desk of drawers, she suddenly exclaimed, "I am dying!" She was seized with convulsions, which continued till five o'clock in the afternoon, when she expired.

On the subsequent day, Mr. Chevalier, whose anatomical skill is well known, examined the body by dissection. Neither the thoracic and abdominal viscera, nor the brain, upon the most minute examination, exhibited the least appearance of disease; in short, not the least trace could be discovered of any morbid affection.

With respect to the three other persons already mentioned to have been indisposed, the servant-maid, one of them, was conveyed to her friends, and recovered. A sister-in-law of Mrs. R. also recovered; but the third, who was her mother-in-law, died, after lingering under disease till March.

These circumstances having been cursorily communicated to the medical society, Dr. Adams, Dr. Hamilton, and Mr. Lawrence were requested to visit the house of this unfortunate family, and to endeavour to ascertain the cause of the calamity. Every culinary article, and the whole premises, were accurately examined, but without its leading to any discovery. It appeared, indeed, that Mr. R., the husband of the deceased lady, had purchased a cask of sugar at a sale, a considerable part of which had been disposed of to some friends in the country, who had used it without inconvenience, and hence no suspicion was entertained of this article having produced the fatality in Mr. R.'s family.

In this state of uncertainty, Dr. Laird, another member of the medical society, visited the house; and, on examining the cask which had contained the sugar, he observed a white powder adhering to its inner surface, and which, on being heated by the blow-pipe on charcoal, afforded globules of lead in the metallic state.

The mystery was thus at length developed. The sugar had been injudiciously put into a cask which had previously contained white lead. That part of the sugar which was sent into the country had probably been taken out of the middle of the cask, and had never come in contact with the lead; whilst that which was used by the family, having been taken from the side, was impregnated with this metal, and doubtless was the source of the fatal events described.

Of nine persons in this family, who were more or less indisposed, four died, and the effects of the poison appear to have been nearly in the ratio of their respective ages.

The infant, fifteen months old, was attacked and expired within the space of twenty-four hours; the child, six years of age, survived a fortnight; Mrs. R., aged forty, lingered three months before the fatal event took place; and the mother-in-law, aged sixty-seven, died four months after the attack.

The symptoms in each were very similar. The vomiting, pain in the stomach, and costiveness, marked the attack of the disease; and the soreness of the epigastric region, in those who recovered, was not removed by medicine, but seemed rather gradually to wear away by time or change of air. The matter vomited was usually of a dark yellow colour, though sometimes green; the fæces were in general dark-coloured; but in the case of Mrs. R. they were completely white during the space of twenty-four hours only.

There was a considerable sameness in the medical treatment. The opiates which were given afforded no mitigation of the symptoms, unless joined with cathartics, and aided by fomentations, &c. The countenances of all the patients exhibited a pale, sickly, wan aspect. The pulse in each was slow and regular, rather indeed sluggish, and generally below the natural state; but in no instance was there any symptoms of paralysis.*

Water impregnated with lead. Metallic lead is readily converted into the state of carbonate by the contact of aerated water, and it is on this principle that we can explain the injurious effects which are frequently produced from drinking water which has remained for some time in reservoirs of this metal, or passed through pipes of it.

Dr. Yeats, in a paper on the waters of Tunbridge Wells, mentions, that in 1815, lead cholics were very frequent at that place. A Mr. Taylor had laid down, in 1814, several thousand feet of leaden pipes, to convey water to the different houses. In the following year, the lead cholic occurred in those houses to which this water was distributed, and all doubt as to the existence of the poison in it was removed by the examinations of Dr. Lambe and Mr. Brande. They detected the carbonate in a very minute state of division in the water.*

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* Eclectic Repertory, vol. 2, p. 402—copied from the Transactions of the Medical Society of London, vol. 1, part 1.

A somewhat similar case is related of officers on-board a packet bound to the East Indies. They put their allowances of water in a leaden cistern, furnished with a stop-cock, and in about three weeks, every one of them was affected with all the symptoms of colica pictonum, in the most violent degree. On arriving at St. Helena, they gradually recovered.†

These facts prove, that water resting in leaden reservoirs, cisterns, or pipes, *may become impregnated with it.* And there is danger to be apprehended from its use, if the quantity suspended be sufficiently large. The exemption occasionally experienced is to be attributed to the want of this last, and also to the circumstance that some kinds of water are unable to dissolve or suspend the lead.‡

LITHARGE is another compound of lead which has occasionally proved poisonous. Sir George Baker states, that twelve infants died successively in convulsions, at Dartmouth, (Eng.) in consequence of an ointment, which had litharge in its composition, being applied to the nipples of their nurses.§ This substance has also been extensively used for the adulteration of wines.

Instances are also frequently given by medical writers, where the *external use* of preparations of lead, when applied to abraded surfaces, has proved deleterious.|| But these are not common.

Different articles of food or drink may become contaminated with this substance.

If the *food* contain any free vegetable acids, or saline preparations, it will attack utensils made of lead, and oxidate, and indeed in some cases dissolve them. This circumstance seems to have been known

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* Brande's Journal, vol. 14, p. 352. Carbonate of lead is insoluble in aerated water. It is *diffused* through it in a very minute state of division, and is very long in subsiding. Ibid. vol. 14, p. 240.

† Medical Commentaries, vol. 19, p. 180. The presence of lead in the water was demonstrated by the application of a solution of sulphuretted hydrogen. Additional cases of the injurious effects of water impregnated with lead, may be found in the Transactions of the College of Physicians, London, vol. 2, p. 419, &c.

‡ In the water of the river Thames, though it flows in leaden pipes, no lead can be detected. And this may be explained by the fact, that the animal matters which constantly accumulate in it, prevent any dissolution or suspension of the metal. They combine with it, and form a bulky, insoluble precipitate. "If you add nitrate of lead to Thames water, you will find that it becomes milky, and that a white powder falls to the bottom, which dissolves without effervescence in nitric acid. It is, therefore, a combination of oxide of lead with some animal matter. Thus it is the impurity of Thames water, that prevents it from containing lead. Probably hard waters, containing sulphate of lime in solution, may also be free from lead. But with these exceptions, we may lay it down as a general fact, that all waters which pass through leaden pipes, or which are kept in leaden cisterns, contain small particles of carbonate of lead."—Dr. T. Thomson, Edinburgh Med. and Surg. Journ. vol. 12, p. 495.

§ Transactions College Physicians, London, vol. 3, p. 423.

|| See Med. Commentaries, vol. 3, p. 199. Orfila, vol. 1, p. 472. Percival's Observations on the Poison of Lead.

to the ancients. Their tin was all adulterated with lead; and Galen, assigning this as a reason, cautions against the use of tinned vessels, and recommends the preservation of medicines in glass ones.*

Earthen vessels glazed with lead, are also very apt to be acted on by vegetable acids. Vinegar corrodes them, and if there be any article of food within, the oxide or acetate that is produced will mix with it.† So also weaker acids. A case occurred some years ago, at Northampton, Mass., where a family, consisting of eight individuals, were all seized with cholic pains, strong convulsive spasms of the intestines, frequent vomitings, and obstinate costiveness, in consequence of eating stewed apples, which had been kept for some months in a large earthen vessel. On examination, the glazing was found corroded, and a solution from the stewed apples exhibited the chemical proofs indicative of the metal.‡ Dr. Eberle also states, that he saw four cases in 1815, arising from apple butter being in these vessels. On examining one of them, a thick crust of acetate of lead was seen covering its internal surface.§

Milk has also acted on vessels of this description.

The adulteration of *wines* by lead appears to be an old devise, and it has been much used, since it destroys their austerity, gives them a sweet taste, and renders them saleable.

Beckmann supposes that the ancients were acquainted with the fact, that lead rendered harsh wines milder; for Pliny remarks, that when the Greek and Roman wine-merchants wished to try whether their wine was spoilt, they immersed it in a plate of lead, which could only be to observe whether by corrosion the colour of the lead was changed.

It was not until the fifteenth century, that the use of lead in wines became so notorious as to call for prohibitions on the part of governments in Germany, and the adulteration of this article appears to have been a subject of deliberation at the diet of Rothenburg, in 1487, and the diet of Worms in 1495.‖ In France this species of villainy was carried to a great excess.

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* Beckmann on Inventions, vol. 4, p. 29. The question has sometimes been asked, whether the sheet-lead, which is wrapped round the tea obtained from China, may not prove injurious. Dr. Thomson has satisfactorily determined this point. He found it on analysis to consist of lead 95.5 parts, and tin 4.5 parts in the hundred. This alloy is not so liable to tarnish as pure lead, and it possesses this peculiar advantage, that when it comes in contact with articles of food, the tin is always acted upon in preference to the lead.—Annals of Philosophy, vol. 4, p. 155. Proust established the fact just mentioned, by numerous experiments.—See his paper on Tinning, copied from the *Journal de Physique*, in the Repertory of Arts, second series, vol. 9, p. 38 and 145.

† Trans. Col. Phys. London, vol. 1, p. 257, &c.

‡ "An account of the poisonous effects of the use of glazed earthen vessels, by W. Meade, Esq."—New-England Journal, vol. 2, p. 258.

§ Amer. Med. Recorder, vol. 1, p. 504.—See also a paper on the danger of using vessels of lead, copper, or brass, in dairies, by Mr. Thomas Hayes, Surgeon, Hampstead, in the Repertory of Arts, 1st series, vol. 7, p. 116.

‖ Beckmann on Inventions, vol. 1, p. 396.

The Duke of Wirtemberg, by a decree dated March 10, 1696, declared it capital to mix litharge in wine, or even to sell litharge in the shops.* And individuals were punished with death for the infraction of this decree.

At the present day, we have every reason to believe, that the sugar of lead is frequently employed by unprincipled dealers.†

Cider, adulterated by lead, has also frequently proved injurious, and indeed to such an extent, that the disease known by the name of the Devonshire Cholic, has been deemed to originate from this cause. I am aware that other causes have been assigned, but it is sufficient for my present purpose, that this fluid, among others, has excited the symptoms in question. And it is certainly well established, that cider, boiled in leaden vessels, has produced death to those drinking it, and that the racking of it in a leaden cistern, or even the grinding of the apples in troughs which are united by lead, has been the origin of serious illness.‡

Rum is also another liquor which may act on lead. Dr. John Hunter mentions, that a violent cholic prevailed extensively among the soldiers at Jamaica, in 1781-2. They were in the habit of drinking rum, and suspecting its purity, he was led to examine it. The result of his experiments induced him to believe that it was contaminated with lead.§ Dr. Franklin also communicated a curious fact to Sir George Baker on this point. About forty years previous, (Sir George's paper was read in 1767,) leaden worms were used in Boston for the distillation of rum. The consequence was so violent to drinkers, and the illness so common, that government forbade their use, and ordered worms to be constructed of block-tin. The dry belly-ache was much less heard of afterwards.||

Even *syrups* have been clarified by the acetate of lead, and thus contain a notable portion of the metal.¶

Saturnine emanations are well known to produce dangerous disease; and these, of course, most readily affect workers in lead, as plumbers, painters, type-founders, printers, and potters. I shall not, however, enter on this subject at present, as it can hardly, if ever, be a subject of legal investigation, and particularly because it can be examined

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* Trans. Col. Phys. London, vol. 1, p. 346

† Thirty-two cases occurred in the Duke of Newcastle's family, then in Hanover, in 1752, occasioned by their using, as a common drink, a small white wine, adulterated with calces of lead.—Dr. Warren, in Trans. Col. Phys London, vol 2, p. 86.

‡ See the papers of Sir George Baker, and Dr. Warren, in the Trans. Col. Phys. London, vols. 1, 2 and 3.

§ Trans. Col. Phys. London, vol. 3, p. 227. Med. Comment. vol. 13, p. 128. When the new rum in the West Indies, thus impregnated, has been kept in a cask for twelve months, it loses its deleterious qualities. This fact is mentioned by Mr. Sylvester, and by him applied to the discovery of a new test—the gallic acid.—See Eclectic Repertory, vol 4, p. 454.

|| Trans. Col. Phys. London, vol. 1, p. 286.

¶ Orfila, vol. 1, p. 454.

with most advantage when we treat of the *diseases of manufacturers*, in the part relating to MEDICAL POLICE.*

It will be proper, however, to give a short sketch of the symptoms produced by the gradual introduction of small quantities of lead into the system. This will illustrate the effects of adulterated food and drink, and also those produced by emanations, or by working in the metal.

Cholic is among the earliest symptoms, and from this circumstance, the complaint has been styled, for a length of time, *colica pictonum*. It is not acute at first, nor of long duration, but frequently returns, and at last becomes intolerably severe. The mouth is dry, there is generally an absence of fever; sickness of the stomach is present, and sometimes vomiting, which will last for several days. The abdomen is drawn inwards towards the navel, and this sinking in is the more observable, as the pain becomes more intense. Costiveness is very common, and the alvine excretions are discharged with pain and difficulty. The urine presents no particular character.

Paralysis of the fingers, hands, and wrists, is also a frequent accompaniment of this disease, and it occurs most severely in those who are in the constant practice of handling preparations of lead. Convulsive motions, prostration of strength, a dry cough, and a gradual wasting, generally attend this stage of the complaint.

It has been observed by some writers, that the appearances found on dissection in those who have fallen victims to saturnine emanations, are strongly indicative of disease—exhibiting inflammation or obstruction of the mesentery and its glands—affections of the liver, spleen, and lungs—and inflammation of the intestines. Most of these are, however, contradicted by modern examiners, and it is denied that, in general, any inflammation is found in the digestive canal. A contraction of the diameter of the great intestines, particularly of the colon, is the only morbid appearance that was observed in numerous dissections.†

Chemical proofs.

ACETATE OF LEAD. (*a*) Sulphuric acid poured on it, decomposes this salt, and gives a white precipitate of sulphate of lead, while the acetic acid is set at liberty, and may be detected by the smell.

(*b*) Sulphuretted hydrogen, and the hydro-sulphurets, immediately blacken the solution of the acetate of lead, and throw down a black sulphuret.

(*c*) The sub-carbonate of soda instantly decomposes it, and precipitates from it, protoxyd of lead, combined with carbonic acid. It is of a white colour. This test is much more exact than the former in detecting minute quantities. One drop of the solution of the acetate of lead, diluted with three ounces of distilled water, was immediately rendered turbid by a few drops of a solution of the sub-carbonate of soda. The hydro-sulphurets produced no effect on the same quantity. The white precipitate thus obtained, on being treated with sulphuretted water, turns black.

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* The following, however, deserves quotation in this place. It is extracted from the late work of Dr. Cooke on palsy. "Dr. Cooke was consulted by a gentleman who had a paralytic affection of one side of his face, without any assignable cause. On inquiry, however, it was found that he had slept two or three nights in a room where the bed was placed near a closet, the door of which had been recently painted what is called a dead white."—Medico-Chirurg. Review, vol. 1, p. 736, Amer. ed.

† Orfila, vol. 1, p. 476.

(d) Sulphate of soda gives a white precipitate. This is also a very minute test.

(e) Ammonia produces a white precipitate, which, when washed and dried, acquires a yellowish tinge.

(f) Chromic acid and the chromate of potash produce a beautiful canary yellow precipitate.

(g) Muriatic acid and the muriates a white precipitate.

(h) A plate of zinc immersed in the solution, becomes covered with a black coat, on which are soon perceived some small scales of lead, extremely brilliant.

(i) The infusion of galls gives a yellowish white precipitate. Gallic acid, in a pure state, is recommended by Mr. Sylvester as a very delicate test; it causes a similar precipitate.*

(k) If the precipitates be dried, or the suspected substance be in powder, they may each of them be united with potash and charcoal, and exposed to heat in a crucible. If lead be actually present, it will be found in a metallic state after the process.

This mode of detection applies equally to all the oxides of lead, as litharge and minium. On being calcined with charcoal, they become decomposed, and furnish carbonic acid gas and metallic lead.

The action of animal and vegetable fluids on the acetate of lead must also be mentioned. A strong infusion of tea produced a yellowish white precipitate. Burgundy wine decomposes the solution, and the mixture thus obtained produces the characteristic tests of acetate of lead, with the sulphuric and chromic acid, the hydro-sulphurets, the sub-carbonate of soda, and zinc. Ammonia, however, produces a dirty yellow turbidness, instead of a white precipitate, and it is therefore not to be depended on in testing adulterated wines. Albumen produces an abundant white precipitate. Gelatine does not affect it, while milk and bile are copiously coagulated by it.†

For the detection of lead in wines, a test invented by Dr. Hahnemann, and known by the title of *Hahnemann's wine test*, has also been recommended. It is prepared by putting together, into a small phial, sixteen grains of sulphuret of lime, prepared in the dry way, and twenty grains of cream of tartar. The phial is to be filled with water, well corked, and occasionally shaken for the space of ten minutes.

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* Eclectic Repertory, vol. 4, p. 454, from Nicholson's Journal.

† Orfila, vol. 1, p. 448 to 450.

When the powder has subsided, decant the clear liquor, and preserve it in a well-stopped bottle for use. This liquor, when fresh prepared, discovers lead by a dark-coloured precipitate.*

Antidotes. From the experiments of Orfila it appears, that the sulphates of soda and magnesia are the most useful remedies against the noxious effects of the salts of lead. They decompose the acetate in particular, and transform it into an insoluble sulphate of lead, which Orfila considers innoxious. He recommends the same treatment for the other preparations. We should aid their operation by diluents and purgatives, and prevent any tendency to inflammation by the antiphlogistic treatment.

The treatment of colica pictonum does not require a notice in this place.

The sulphuret of potash should never be administered as an antidote, since it is (as we shall hereafter shew) itself a poison.

Having concluded our examination of the older metals and their compounds, as instruments of poison, we shall now briefly notice two other simple bodies, which have been made the subject of experiment by Orfila.

Phosphorus, when dissolved in oil, and injected into the jugular vein, instantly produced copious exhalations of phosphorous acid. The respiration was difficult and panting, and considerable quantity of a bloody serosity was thrown up, and death followed in twenty minutes after the injection. The lungs, on dissection, exhibited several livid and dense portions; the stomach was natural, and the left ventricle of the heart contained blood as black and fluid as that which filled the right. When phosphorus is introduced in small lumps into the stomach, it does not at first induce any remarkable effect, but the animal falls gradually into a state of depression and dies. The stomach is much inflamed, and contains a thick greenish fluid. In an experiment where our author administered one hundred and forty grains in small lumps to a dog, one hundred and twenty-seven only were found after death, in various parts of the intestines.

The action of this substance is infinitely more violent, when it is introduced into the stomach in a state of solution with oil. Fumes of phosphorous acid were exhaled from the lungs, and the subject seemed to suffer exquisite torture. It then lay immovable, but about six minutes before he expired, general and violent convulsions occurred. The stomach was corroded in three places, and the mucous membrane, where it had not been perforated, was reduced to a stringy kind of pulp. The lungs were red, distended with blood, and did not crepitate.

Treatment. As inflammation is evidently the consequence of the exhibition of phosphorus, we should, of course, use the appropriate remedies for removing it. An emetic must be premised to remove, if possible, the poisonous ingredient, and water containing magnesia in a state of suspension is also advised, as tending to fill the stomach with fluid, and at the same time neutralizing the acid that is forming.[*]

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* Henry's Chemistry, vol. 2, p. 276. Orfila, in his Directions, gives minute directions for the detection of lead in wines. They are, however, merely repetitions of the tests stated above.

Iodine. Orfila is the first who tried any experiments with this substance. He found that dogs, if they vomited freely, survived, although they had taken a drachm and upwards of it; but when this did not occur, or if the œsophagus was tied, it invariably proved fatal, after exciting violent efforts to vomit, hiccup, thirst, quick pulse and great depression. The mucous membrane of the stomach was always found corroded and ulcerated, but the lungs and other organs were natural.

Our author was able, in some cases, to detect the iodine in the matter vomited and passed by stool. On drying and exposing it to heat, the violet-coloured vapour appeared.

A drachm and twelve grains were sprinkled on a wound on the back of a dog. The skin immediately grew yellow, and in three days an eschar formed, leaving the subjacent parts highly inflamed. The animal however recovered.

Our author next ascertained the effect of iodine on the human subject. He himself took two grains fasting, but they only excited an abominable taste, and nausea. The next morning, he took four grains. He was immediately sensible of constriction and heat in the throat, which continued a quarter of an hour, and he soon vomited yellow liquid matter, in which iodine was readily discovered. Two days after he took six grains, which instantly excited heat and constriction of the throat, nausea, irritation, salivation, and pain of the stomach, and in ten minutes, copious bilious vomitings and slight cholic pains, which yielded to two emollient enemata, after having continued an hour. The pulse rose from 70 to 90 and was fuller. The next day he felt only a slight fatigue.[†]

THE ACIDS.

Sulphuric acid. That this substance should sometimes be the cause of death may readily be conjectured, but it requires some acquaintance with human folly and wickedness, to believe that it could be thought of as the instrument of suicide, and even of murder. Such is, however, too certainly the fact.*

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[*] Orfila, vol. 1, p. 405 to 414. It is stated by Dr. Thomson, that if phosphorus be allowed to stand in water for some time, it will render that fluid poisonous to animals that drink it.—Annals, vol. 16, p. 232.

[†] Orfila, vol. 1, p. 490. Dr. Coindet, of Geneva, has lately exhibited this substance in bronchocele. His prescription is thirty-six grains of the hydroiodate of potash, and ten grains of iodine dissolved in an ounce of distilled water. From six to ten drops are at first prescribed three times a day, and the dose is increased or diminished according to the effects produced. The following symptoms have been occasionally observed by him from its use. "Acceleration of the pulse, palpitation, dry cough, watchfulness, marasmus, and prostration of strength;—sometimes swelling of the legs, tremors, painful hardness of the bronchocele, diminution of the breasts, or a remarkable augmentation of appetite supervene; and he adds, that in almost all the instances which he has observed, to the number of five or six, a very rapid diminution, or a disappearance more or less complete, has taken place during these symptoms, even in hard, bulky, and old bronchoceles."—Quarterly Journ. Foreign Med. and Surg. vol. 3, p. 348.

The following are some cases illustrative of its effects:

Joseph Parangue, a soldier, about the end of January, 1798, between seven and eight in the morning, swallowed, by mistake, a glass of sulphuric acid, imagining it to be brandy. He drank it off at once, with his head back, and poured it from a distance into his mouth. By this means he did not discover his mistake until he drew his breath. He was instantly conveyed to the hospital, and Dr. Desgranges being at hand, he immediately saw him. Excessive vomiting, convulsive agitations of the muscles of the face, violent cramp in the stomach, and an acrid burning heat in the throat and œsophagus were present. The body was icy cold; the pulse small, concentrated and irregular, and the breathing difficult. The carbonate of magnesia, suspended in water, was administered with considerable relief; and although vomiting returned once, yet, by the continuance of this remedy, the anxiety and pain diminished, the pulse rose, and a genial heat was diffused over the body. The antiphlogistic regimen and diluents were subsequently required to remove the consequences of this potation. The whole of the mouth and throat was found, on the subsequent day, excoriated and covered with eschars, the epiglottis swelled, and, on the fourth day, a slough from the uvula almost threatened suffocation. This gradually came away and he finally recovered, but a painful sensibility of the throat and stomach remained for a length of time, especially when he ate hastily, or used food that was indigestible.†

A female swallowed some for the purpose of destroying herself, and in four hours thereafter was brought to the Hotel Dieu. Pain, coldness of the skin, constipation, and inquietude were present, with copious and repeated vomitings of a deep blue-coloured and glairy fluid. Proper remedies were given, but the symptoms increased in severity. On the second day, the face appeared greatly deranged, the cold on the surface increased, the pulse became insensible in the wrists, and carotids; the breath was extremely fœtid; a few drops of very high-coloured urine escaped from time to time, and the disquietude and agitation were extreme. She could not bear any kind of covering, and the region of the stomach was exquisitely sensible to the slightest touch. On the fourth day she was incapable of resting a single instant in the same position, and rose up, for the purpose of going to a cold place. Death finally relieved her on the fifth day, and she preserved her reason to the last.‡

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* In January, 1808, a female was tried and convicted at Edinburgh, for the murder of her natural child, aged eighteen months. It was proved that she had poured a quantity of oil of vitriol down its throat, pretending that she was giving it raw sugar. Violent retchings and vomiting immediately ensued, and it died in a few hours.—Edinburgh Annual Register, vol. 1, part 2, page 4.

† Orfila, vol. 1, p. 315. Foderé, vol. 4, p. 96.

‡ Orfila, vol. 1, p. 320, quoted from Tartra.

In one case quoted from Tulpius, a miliary eruption appeared over the whole body, in addition to the ordinary symptoms.

Its effects on an infant are illustrated by an instance that occurred to Dr. Bateman. A mother, by mistake, administered about a teaspoonful to her child, aged two and a half years. This was at half-past four, P. M. She immediately excited vomiting, by putting her finger in the child's throat, and the matter brought up resembled coffee-grounds. It seemed to suffer little pain except when vomiting, which occasioned crying, and it died easily, and almost unperceived, at nine the same evening.[*]

These cases (particularly the first and second) give a full view of the symptoms ordinarily observed, and it is therefore not necessary to repeat them.

Appearances on dissection. In the case of the female related by Tartra, the abdominal viscera were for the most part œdematous, and the coats of the duodenum were in several points nearly dissolved. The stomach externally showed great distention, was of a dark colour, and exhibited several spots indicative of deep disorganization. The mucous membrane of the œsophagus was burnt, blackish, and partly detached. The stomach contained a dark and very fœtid fluid; similar to what she had vomited, and it was much thickened in some points, and corroded in others. The internal coat was entirely dissolved, and reduced to a state of mucus throughout the greatest part of its extent. The pylorus presented the most decided marks of disorganization; its coats were black and puffed up, and almost closed the orifice. The duodenum and jejunum were partly destroyed and burnt, and attacked with sphacelus, and the whole of the intestinal canal partook more or less of the injury.

In Dr. Bateman's case, the omentum was seen converted into a black pulpy mass, but still possessing sufficient tenacity to retain the food which had escaped from the stomach. There was also in the omentum a small quantity of dark-coloured fluid, similar to what had been vomited. In the stomach, there was an erosion or aperture about three inches in diameter, bordered by thickened edges of a dark-brown cinder-like appearance. The œsophagus, with the exception of a slight purple blush, showed no marks of disease. There was an appearance of inflammation towards the cardia, but none towards the pylorus. The intestines were free from inflammation, although they were strongly marked with transverse corrugated rings.[†]

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[*] Edinburgh Med. and Surg. Journal, vol. 10, p. 257.

[†] Two additional cases of poisoning with sulphuric acid, (one an act of suicide, and the other accidental,) are quoted from a German journal in the London Med. Repository, vol. 14, p. 160. Death ensued in the first case after a few hours. On dissection, the cranium, lungs, and pericardium, were generally healthy. The œsophagus was internally whitish, and the shrivelled epidermis but loosely connected with the subjacent muscles—the diaphragm brownish, very soft, and in some places much corroded—the omentum nearly destroyed. The stomach, of a dirty brown colour, tore on the slightest touch; contained fluid of a sourish and some-

In what may be styled a chronic case, where a quack had administered some sulphuric acid and oil, difficulty of drinking, speaking, and even breathing, occurred during life. The deglutition of fluids

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what cadaverous smell, and brown colour, and mixed with white caseous matter, and blackish coagulated blood.

This fluid was passed through filtering paper, and then imparted a red colour to litmus paper. A solution of muriate of barytes dropped into another portion, produced a white precipitate, which was wholly soluble in pure nitric acid; and hence sulphate of barytes. To a third portion was added a solution of nitrate of lead; from this immediately resulted a white precipitate, again soluble in the supernatant liquid. Consequently, as demonstrating sulphate of lead, it confirmed the evidence of the first experiment, and clearly proved the presence of sulphuric acid in the contents of the stomach.

The coats of the organ itself were scarcely recognizable; in some places very thick, with coagulated blood extravasated between them; in others, dark brown, much corroded, exhibiting as it were gangrenous spots; and their whole substance extremely soft and lacerable. The internal membrane of the small intestines shrivelled, and the valvulæ conniventes projecting one on the other, so as to close the whole canal. The mucous coat of the large intestine also white and wrinkled up, but otherwise unaltered. Pancreas sound. Liver externally discoloured; every where very firm and compact; its external surface cutting like leather to the depth of some lines, and of a brown colour; internal structure bright red. Gall-bladder, its membranes considerably thickened, containing a thin and almost colourless fluid, and bright yellow bile strongly adherent to the blood-vessels, which projected on its internal surface. Spleen firmer than natural, and resembling, on incision, the liver. The kidneys, except that they presented a leather-like surface, unaltered. Urinary bladder empty.

The second case is peculiarly interesting, as the patient survived two months. On examination, the body was so emaciated, that "the cellular membrane, in the intervals of the muscles, appeared quite empty, and the muscles themselves projected distinctly beneath the skin. The bones, with all their prominences, perfectly visible. The teeth firm; gums of a pale blue-colour; tongue yellowish white; nostrils dry, and widely dilated. The belly so sunk in, that its parietes seemed completely drawn together, and the navel to rest upon the spine. Anus closed. Livid specks observed on the inguinal region only. No trace of external injury.—*Abdomen.* Adipose substance completely absorbed. Omentum merely a delicate transparent membrane, interwoven with vessels. Liver uncommonly small, of a dark-brown red colour. Gall-bladder distended with bile. Spleen of a bright blue or lead colour. Transverse colon low down; and greatest portion of the small intestines deeper than usual in the pelvis. All the parts in the vicinity of the gall-bladder, the peritonæum, and muscles, of a dark-brown colour. No traces of inflammation. The stomach was so contracted as to measure but five inches long and three deep. Its membranes every where, but especially in the vicinity of the cardia and pylorus, considerably thickened; the orifice of the latter scarcely four lines wide, but its circumference thickened, and of cartilaginous hardness. On the villous coat of the organ, and near the pylorus, several small, red, firm, granulated spots, with elevated margins, which had the aspect of incipient carcinoma, and evidently indicated the operation of a corrosive fluid. In the pylorus itself, cardia, and great curvature of the stomach, similar spots; but those in the two latter situations smaller, and less red. One in the fundus of the organ, of a greenish-blue colour, and two inches in circumference, exhibiting several small vessels much gorged with blood. A bluish patch on the external surface corresponding to it. The duodenum in the same state as the stomach, but more strongly marked, the nearer it approached that organ. The villous coat of the small intestines exhibiting very firm wrinkles, disposed in rows. Membranes of jejunum and inferior portion of ileon extenuated; their blood-vessels, as it were, injected, and villous coat much wrinkled. Large intestines displaying these changes in the slightest degree, and containing some bright-yellow excrement. Kidneys firm and small. Bladder empty and contracted.

was impracticable, and an elastic gum sound was introduced, in order to enable the patient to take a little nourishment. This gave present relief; but, in a short time, she became unable to bear its introduction, and was reduced to chew watery vegetables to quench her thirst. The smallest quantity of fluid threatened immediate death. Debility, marasmus, and œdema, soon followed, and she finally expired at the end of several months after taking the mixture.

On dissection, the sole lesion observed was a hardening of the epiglottis, in consequence of which it did not close more than half of the glottis.*

Effect on animals. It would certainly seem unnecessary to ascertain the effects of the injection of sulphuric acid into the veins, since, so far as I can ascertain, no practical purpose is to be gained by it.† Orfila has, however, instituted some experiments in this way. It caused instant death by coagulating the blood. When introduced into the stomach, it killed by the inflammation and disorganization of that organ, and when applied to the skin, by the burn that it produced, or the suppuration of which it was the consequence.

The other acids (nitric, muriatic, phosphoric, fluoric, &c.) acted in a similar manner. It will therefore not be necessary to notice this head again, unless there is something peculiar to be mentioned.

Chemical proofs. These will afford but little aid, since the sulphuric acid can seldom be obtained in a liquid form from the stomach after death. Should its presence, however, be suspected in the fluids vomited, we may treat it with carbonate of lime. This causes an effervescence, and the production of sulphate of lime. Barytic water and nitrate of lead when added, also yield a white precipitate, consisting of the respective sulphates, whose character must be ascertained by their appropriate tests. Our main reliance for proofs must be on the symptoms and the appearances on dissection. And if any remains of the poison can be found and identified, we may ascertain its nature by means which are familiar to every chemical student.

Some of the succeeding results may tend to elucidate the phœnomena found on dissection.

Syrups and tea are not affected by the suphuric acid. It brightens the colour of wine. Gelatine becomes more limped with it, but albumen is copiously precipitated of a white colour. Milk is instantly curdled. One or two drops poured on human bile causes a beautiful

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Gall-bladder affording a considerable quantity of dark-green thick bile.—*Thorax.* Lungs collapsed, marbled with red and blue. Pericardium very firm, and containing a quantity of fluid. Heart large; little blood in the ventricles, especially the left; auricles empty. Œsophagus thickened, but without inflammation or corrosion.—*Cranium.* Clear lymph beneath the dura mater, diffused over the whole brain. The same, coagulated, beneath the tunica arachnoidea, and all the cerebral vessels much gorged. Small quantity of fluid in the lateral ventricles. Basis of brain natural."

* Pelletan, vol. 1, p. 19.

† And particularly as Fracassati performed the same experiments, with similar results, one hundred and fifty years ago.—See Phil. Trans. vol. 2, p. 490.

precipitate of a yellow colour, and this appearance is sometimes seen on dissection, in the duodenum, from the above cause. Lastly, when mixed with fluid blood, it coagulates and decomposes it, and if the acid is concentrated, it turns it to a deep brown and carbonizes it.*

Treatment. Water containing calcined magnesia in suspension, must be instantly administered, or if this cannot be procured, soap and water or chalk and water. The caustic must thus be neutralized, or the patient is lost. The subsequent treatment must depend on the degree of inflammation present.

NITRIC ACID. We are indebted to Dr. Tartra, of Paris, for an able and comprehensive essay on this substance as a poison. And from the extracts given by Orfila, and a most instructive analysis contained in the Edinburgh Medical and Surgical Journal, I have taken the following particulars.†

Dr. Tartra arranges the cases of poisoning by nitric acid into four classes. "1. When the death is speedy, for it is never sudden. It commonly takes place from the primary effects in about twenty-four hours, varying from six to forty-eight hours. 2. When it proves fatal from its secondary effects, at various distances of time, from fifteen days to some years. 3. When death does not take place, but the recovery is imperfect. 4. When a perfect cure is sooner or later obtained.

1. The following example will give a tolerable idea of the progress of the symptoms in the first case. A man driven by distress to commit suicide, under the greatest agitation of mind, and upon an empty stomach, swallowed, at a draught, two ounces of concentrated nitric acid. Instantly he was seized with the most excruciating pains and agitations, and could not lie in bed, but rolled himself upon the floor. Vomiting came on, accompanied by general sensation of coldness, especially in the extremities. Every time he vomited, the matter effervesced upon the pavement. He got a solution of soap and oil. In two hours he was brought to the hospital; and upon the road he frequently vomited and stopped to drink. On his arrival, he got emollient drinks, especially linseed tea, in great abundance. He was in continual agitation, and his countenance very much altered. He vomited every instant a blackish glairy matter. He opened his mouth easily, and his tongue was white, with a tinge of yellow. He had acute pains in his mouth, along the œsophagus, and in his stomach. His belly slightly tense, could not bear the slightest pressure, it so excessively augmented his pains. The surface of his body was cold; his pulse small, concentrated, and frequent; he had

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* Orfila, vol. 1, p. 310-311. It is also proper to immerse portions of animal flesh in sulphuric acid, and observe whether their appearance resembles that found on the dead body. This was the mode pursued by Dr. Bateman, and with a satisfactory result. The *black colour and pulpy consistence* were not produced by other caustics.—Edin. Med. and Surg. Jour. vol. 10, p. 257.

† Orfila, vol. 1, p. 329 to 360; vol. 2, p. 560. Edin. Med. and Surg. Jour. vol. 9, p. 369. Review of "*Traité de l'Empoisonnement par l'Acide Nitrique*, par A. E. Tartra, medicin. Paris, 1802."

hiccup; and his respiration was laborious. His symptoms increased. He uttered sighs and lamentations. His limbs became icy; a cold sweat covered his whole body; his pulse was almost imperceptible, and the pain was constant. Still he could rise, and make continual and useless efforts to quench his thirst, and satisfy his urgent desire to make water and go to stool. He continued in this state during the night. The matter vomited became more clear, and of a yellow colour. He at last made a few drops of urine. The shocking appearance of his body already resembled that of a corpse, but he retained his senses, and was speaking when he expired, nineteen hours after swallowing the acid.

The burning heat and pains which are commonly the immediate effects of nitric acid, when swallowed, present striking contrasts. In general, they are not in proportion to the quantity or strength of the acid swallowed. Often, persons who have taken only a small dose, are seized with the most excruciating and dreadful pains; and some of those who have swallowed a great quantity, two or three ounces for example, have had scarcely any suffering, but remained very tranquil. In the first case, the patients either recover or survive a long time. In the second, speedy death is almost always the consequence. Thus a young man of twenty died in twenty hours, without any agitation or signs of acute pain. On opening the body, the highest degree of disorganization appeared, perforations of the stomach, and great effusion of its contents into the abdomen.

A woman said she had taken nitric acid, but she seemed so little affected by it, that many thought she was imposing on them. There was no agitation, no pains or vomiting, but the smallness of the pulse, lassitude, and prostration of strength, rather indicated a typhus fever. Next day she died; and on examining the body, there was found the greatest degree of disorganization that nitric acid is capable of producing, perforation of stomach, gangrenous spots, effusion into the abdomen, marked corrosion of all the viscera, and general yellow colour.

But when the acid, from deficient quantity or strength, only acts on the mucous membranes, then it does not always prove fatal; but the pains are excessive, the cholic dreadful. In the one case, the sensibility seems to be annihilated: in the other, excited in the highest degree. Here, as on many other occasions, the pain is to a certain degree proportionate to the severity of the affection, but after a certain point it seems rather to be in an inverse ratio.

In fifty-six cases, death from the primary effects took place in nineteen.

2. The second variety of the progress and termination of poisoning by nitric acid, exhibits at first the same phenomenon as the preceding. But less alarming symptoms succeed by degrees, anxiety, irregular fever, dryness of the skin, spasmodic constriction of the extremities, wandering vague pains, deep and difficult inspirations, dryness of the tongue and throat, excessive thirst, deep pain in the region of the stomach, habitual tension of the abdomen, obstinate costiveness,

vomiting less frequent, a kind of copious salivation, uneasiness in the throat, from the imperfect detachment of the flakes of the membrane lining it, portions of it still partially adhering, frequently floating in the pharynx, and disturbing both respiration and deglutition.

The pulse is often miserable, and the slow fever has no remission; the cold continues over the surface of the body, and there are irregular fits of shivering occasionally. Every kind of food, solid or liquid, is vomited. Milk alone seems to agree with the stomach. After some time, the inner membrane of the alimentary canal detaches itself in portions, which are discharged by vomiting, with floods of frothy and intolerably fœtid saliva. Membranous flakes, swelled, rotten, and often of a very great size, are frequently pulled out of the mouth. This state lasts, in some cases, only about a fortnight, generally several months, and occasionally for years. But these persons uniformly fall into complete marasmus. Digestion is totally deranged. The stomach can bear no kind of food. All the functions languish.

The constipation increased to such a degree, that whole months pass without a single alvine evacuation. These invalids will go to the close-stool twenty times a day, to satisfy their urgent desire to have a stool, and, in the course of three months, only pass once or twice small masses of feculent matter, formed like pills, of a few grains in weight. Injections are of no use, but are frequently retained, and sometimes do harm.

Instead of amending, their situation grows daily worse. Insupportable to themselves, inconstant and impatient, they seek in vain for relief. Emaciated in the greatest degree, they resemble walking skeletons. Their whole appearance is revolting—spitting every instant, vomiting continually, or their lips and chin covered with filthy putrid saliva. It is difficult to conceive how the exfoliation of the œsophagus and stomach can furnish such a quantity of eschars as are discharged by vomiting, and in some few cases by stool, during whole months. Nothing can exceed the intolerable fœtor of these putrified membraneous flakes. Sometimes, when discharged by the mouth in small quantity, they form portions of hollow cylinders, detached from the entire circumference of a part or the whole of the œsophagus, and in some rare cases, where the whole internal membrane of the œsophagus and stomach has been but slightly and uniformly affected, the whole exfoliates at once, and even in a single piece, threatening instant suffocation. Digestion being completely suspended, the system seems to live upon itself, as if the organs of secondary importance to life were absorbed, to nourish those indispensable to its continuance.

The muscles are considerably reduced in bulk, the cellular membrane is every where sunk, the adipose system entirely disappears, and the integuments are glued upon the bones, exhibiting their rudest forms. The skin becomes dry, scaly, and almost dead and inert, as in extreme old age. The physical faculties are extinct, and the moral faculties are singularly decayed. There remains only their shadow, as it were. The ravages which, in the course of nature, ought to be the progressive effects of many years, are completed in a few months. Every thing in these individuals presents the picture of accidental and premature old age. The individual still lives, but is only separated by an imperceptible interval from death which encroaches daily upon the province of life. A certain activity of the animal life still remains, when the organic, remarkably reduced and decayed, is just about to cease.

This variety of the progress and termination of the disease, induced by swallowing nitrous acid, is not uncommon. It took place in *seven* of the *twenty-nine* cases now first described by Dr. Tartra, and he accounts plausibly enough for its having been seldom observed before, by supposing, that when persons who had swallowed nitric acid had got the better of the primary symptoms, they were lost sight of, and the subsequent affection was not imputed to the proper cause.

Such, in general, is the progress, when patients die of the secondary symptoms; but in the case of a female it was considerably different, as well as the appearances on dissection. The constipation was not very great; the expectoration did not last long, and the vomiting was rare; but a fixed pain at the bottom of the thorax, accompanied by difficulty of breathing, and spitting of blood, deceived the medical attendants who were not acquainted with the fact of her having drunk nitrous acid. She was treated as if for pectoral complaints, and died in about sixty days after having swallowed the poison.

In this case alone, the body was not remarkably emaciated. The stomach was only a little contracted and adhered in several places, especially to the liver and spleen. It contained a mass of solid blood, of a dark red colour, the size of a fist, moulded to the shape of the stomach, and covered by a very fine membrane, which seemed to be either the mucous membrane detached from the stomach, in several places, or perhaps a membrane of new formation. The intestinal canal, in this case, was of the usual size. Death seemed to have taken place before the gradual consumption had wasted the body.

3. The third variety of termination is in imperfect recovery. This is also very frequent, and is characterized by the same train of symptoms with what we have now described, but very inferior in degree. The exfoliation of the œsophagus and stomach either takes place but once, or only a few times. A slow and progressive amendment ensures the safety of the patient. But there still remains some complaint; obscure pains in the throat, and especially in the epigastric region; habitual constipation, occasional vomiting, and increased sensibility of the stomach, so that that organ can only support light nourishment and bland liquors. In short, they continue invalids during the rest of their lives; they are subject to repeated and even habitual indispositions, and sometimes to pain and insupportable heat of the stomach. But they are able to follow their occupations, and long survive their poisoning. Dr. Tartra has met with *eight* examples of this termination of the disease, in fifty-six cases.

4. The total disappearance of the symptoms produced by swallowing nitric acid, or complete and absolute recovery, without leaving any con-

sequences, is the last variety of termination. Of fifty-six cases, the recovery seemed to be complete in *twenty-one.*

Appearances on dissection. When the patients die of the primary effects of nitric acid, the external appearance of the body presents no alteration; every part is sound and natural, and presents, in a certain degree, the firmness and freshness of life. The epidermis of the margins of the lips has commonly an orange colour, more or less deep. It seems burnt, and separates very easily. Sometimes yellow spots are discovered on the hands and other parts of the body, caused by the contact of nitrous acid. A yellow fluid, in some cases very abundant, flows from the mouth and nostrils, and the belly is considerably distended with air.

The alimentary canal is remarkably affected. All the internal membrane of the mouth is burnt, and has sometimes a white, but more commonly a yellow colour. It is separate in some places, and adheres in others. The teeth are often loose, and have a very marked yellow colour at their crown. The mucous membrane of the pharynx exhibits the same change, or is in a state of inflammation of a dirty red colour. The whole extent of the œsophagus is lined with a dense mass, of a fine yellow colour, dry on its surface, unctuous, and greasy to the touch, and which seems to be formed both of the mucous membrane, altered in a particular manner, and of the albumen contained in the viscid fluid which exudes from the membrane of the œsophagus, solidified by the nitrous acid. This lining adheres in very few points, and is easily detached from the other membranes of the œsophagus, which are brown and blood-shot.

When the stomach is not perforated, it has commonly a considerable size. Externally, its membranes are slightly and partially inflamed, but very much towards the pylorus and beginning of the duodenum. Its colour is faded, livid, of a yellowish green, with large gangrenous spots. It adheres every where to the neighbouring parts—the diaphragm, liver, spleen, and transverse arch of the colon, by means of a concrete lymphatic exudation. Its sides, which are thin and yellow in some places, and thick and black in others, exhibit net-works of dilated blood-vessels, filled with black coagulated blood. Often there are several points of the stomach dissolved, and ready to burst with the slightest touch. It contains a great quantity of gas, which has a particular smell, resembling that of bitter almonds. Most commonly, it also contains a great quantity of yellow matter, having the consistence of pap, in which there are flocculi, or small masses, resembling tallow, which, however, may be the cheesy part of the milk drunk by the patient, decomposed in the stomach. Its sides are coated internally with a thick grained paste, of a yellowish-green colour, composed, according to all appearance, of the internal membrane, disorganized and dissolved, and of coagulated albumen. Almost always the substance of the stomach is swelled in some places, and deeply marked with black, without being dissolved. This effect is most remarkable at the great end, into which the acid seems to fall by its weight. The rugæ of the stomach are very brown, and are reduced to mucilage. They are easily removed by the finger from the nervous coat, which, by reason of its whiteness, often appears in a great measure sound. The small end is affected with many deep spots of gangrene, and the pylorus is much contracted.

The duodenum internally, especially at its two curvatures, presents the same kind of change as the stomach. Its sides, as well as those of the jejunum, are marked with yellow, slightly greenish. They are also lined with a very thick orange crust, and the villous membrane is dissolved and destroyed. These phenomena have less intensity in proportion as the part is more distant from the stomach.

The surface of all the abdominal viscera is commonly very much inflamed. The peritonæum is thickened, hard, of a dirty red, covered with albuminous layers, which unite, by numerous adhesions, all the viscera, and especially the folds of the intestines, as it were into a single mass.

The thoracic surface of the diaphragm, and of the inferior lobes of the lungs, is covered with a very solid layer of albumen, of a whitish colour.

A bloody liquid is effused into the abdomen; there is also a small quantity in the chest.

The urinary bladder contains no urine, although the patients have not discharged any. The large intestines are usually filled with very hard fæces.

In most cases, where the stomach is perforated, its bulk is very small; in other respects it is the same. The holes commonly occur in the large and small extremities: their form is circular, and their edges thin, and as if dissolved. We then find in the abdomen an enormous effusion of a thick yellow liquid, containing many white flocculi, and resembling the fluid with which the stomach is filled when it is not perforated. The greatest distention always accompanies this state of the belly. The alteration and disorganization are carried to the highest degree. The surface of the abdominal viscera seems to have suffered the direct action of very dilute nitric acid. It is greasy and unctuous to the touch, and almost every where spotted with yellow.

The appearances upon dissection of those who die of the secondary effects, are entirely different from those now described. It would be difficult to find an example of greater emaciation, more advanced consumption, or disgusting form. Nothing is equal to the degree of withering, drying up, and decrepitude of the whole organs. Their colour is faded; the internal cavities do not contain the usual serum; the cellular and muscular systems are almost annihilated; the bones become dry, as in persons of advanced age, and break with wonderful facility. But these changes are general and secondary, and depend upon local organic derangement of the alimentary tube. The stomach and whole intestinal canal are contracted to an extremely small size, so that they could be contained in the hollow of the hand. The intestines are not larger than the little finger, sometimes not exceeding a thick writing-quill. Their coats are very thick, their cavity almost obliterated, and containing only a little mucosity. In general, all the parts touched by the poison are contracted, and as if obliterated. The stomach, which often resembles a portion of a small intestine, appears sound externally, and only presents some adhesions to the diaphragm, liver, and spleen; internally, the most remarkable change is, the contraction of the pylorus, the passage through which is not larger than a lentil, or even scarcely admits a probe; and the membranes of the stomach itself are so thickened and compacted around it, that they have lost all their natural suppleness.

On the internal surface there are irregular spots, or, rather, smooth and red places, which seem to be covered with a regenerated mucous membrane, less villous than that which has been destroyed by the action of the acid. These cicatrices are especially large and numerous in the great end of the stomach, and around the circumference of the pylorus. There are also commonly some at the cardia, as well as in the lower half, and even the whole of the œsophagus and pharynx. The adhesions of the stomach with the neighbouring parts are sometimes simple, but most commonly they are very remarkable. Viewed from the inside of the stomach, they form irregular, circular depressions, where the whole thickness of the coat is evidently wanting; so that in attempting to destroy these adhesions, we find that there are in fact so many holes through the substance of the stomach, which are plugged up by the adhesion of the neighbouring viscera."

Chemical proofs. The usual effects of alkalies and earths on this acid are too well known to need repetition in this place. We shall hence only mention its operation on animal and vegetable fluids. Syrup and gelatine are not disturbed by it. The colour of tea is heightened by its addition, and Burgundy wine acquires a redder colour. When added to albumen, a white precipitate is abundantly produced, which after some time becomes yellow; and if this yellow mass be washed and dried, and afterwards boiled with a solution of pure potash, the liquor will at once become of a rich red colour, and will furnish, by evaporation, a brown-red mass, composed of animal matter, *nitrate of potash,* and the excess of the alkali employed. Milk, mixed with this acid, is instantly coagulated, and throws down white curds, which quickly change to yellow. Human bile, brought in contact with two drops of it, gives an abundant precipitate of the *yellow matter,* which acquires a *green* colour by the addition of a fresh quantity of acid, and in the end becomes of a brick-red, when a great quantity of acid is employed. Fluid blood is instantly coagulated.

If the remainder of the poison can be procured, we should unite it with copper filings, when nitrous gas will be evolved, and the blue nitrate of copper formed—also with pure potash, as above directed. On the patient, whether living or dead, we are to notice whether any orange-coloured spots are present, either on the face, hands, lips, or mouth; and in the latter case, if the fluids vomited or found do not afford any satisfactory explanation, we must collect the flaky and solid substances. These are to be boiled for three quarters of an hour in a solution of pure potash, and the liquor is then to be evaporated. Nitrate of potash will be produced, if the poison has been nitric acid.*

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* Orfila, vol. 1, p. 331, 352.

Treatment. The indications, according to Tartra, are two. 1. To moderate the progress of the poison; that is, to prevent the action of the uncombined portion. 2. To remedy its effects, or the changes produced by the portion that has already acted.

The first requires the instant administration of antacids, aided by neutralizing substances, as solutions of soap, magnesia diffused through water, &c. The second is to be fulfilled by means of demulcents, emollients, and antiphlogistic remedies. Barley-water, whey, milk diet, and emollient injections, are chiefly required, and all irritating and stimulating substances are to be carefully avoided.*

It is not necessary for me to go into any detail concerning the remaining acids that have been enumerated as poisons. Their effects are generally similar to those already noticed, except that the characteristic colour of the nitric will be wanting. The mode of treatment must be similar. Orfila mentions the following as poisons: the *muriatic*, the *phosphoric*, the *fluid nitrous*, the *fluoric*, the *sulphurous*, and the *phosphorous*.

CAUSTIC, OR CARBONATED ALKALIES.

Pure potash, when externally applied, is well known to act as a powerful caustic. On injecting a solution of it into the jugular, it produces sudden death; and on dissection, the blood is found coagulated. When swallowed by an animal, it corrodes the stomach, and inflames its mucous membrane.

The *sub-carbonate of potash*, (salt of tartar,) is also a poison of considerable activity. A dog to whom two drachms were administered, died in fifteen minutes: and Plenck mentions a case, where a patient in good health took an ounce, which produced violent vomiting and gastritis. Life was, however, preserved.† The following are recent instances of its effects, and deserve considerable attention.

Two females, of the age of sixteen and twelve, each took by mistake half-an-ounce of sub-carbonate of potash. Violent sickness immediately ensued, but the error was not discovered until two hours and a half afterwards. The vomiting and sickness scarcely ever ceased entirely with the elder, and she also experienced pain in the epigastric region. Leeches were applied, and various curative means, but with little success. The vomiting, though occasionally checked, yet returned with violence, and she died in about two months after taking it. The other suffered under sickness for three days, and it then ceased. She appeared to grow better, but in a few weeks the sickness returned, and she was confined to her bed. Death ensued about three weeks after that of her sister.

Appearances on dissection. The appearances of disease were similar in both, although most striking in the eldest. The stomach was much thickened, and the villous coat was almost wholly destroyed; what remained was in a state of high inflammation. The pylorus in one was much ulcerated, and, in the other, contracted and gangrenous. The intestines were gangrenous, and adhered together by thin threads of coagulable lymph. The omentum in the youngest was almost totally destroyed, and the glands of the mesentery for the most part absorbed. The liver in both was of a dark-green hue, in consequence of the transfusion of bile, and the gall-bladder was distended with it, probably from the circumstance that the biliary ducts were found almost obliterated.

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* Stalpart mentions the case of a child, three years old, who had taken some nitric acid, which he cured by oil and syrup of violets, and forbidding every article of food except lukewarm milk. (Vol. 1, p. 196.) He quotes instances treated in a similar manner.

† Orfila, vol. 1, p. 380.

Both these females had previously been in delicate health.*

The peculiar styptic and urinous taste—a severe heat in the throat—retchings—vomitings of an alkaline matter, which commonly effervesces with acids—copious alvine evacuations, accompanied with violent pain, and injury of the intellectual faculties, are among the leading symptoms produced by this substance.

Orfila suggests that this alkali, of all the corrosive poisons, is that which most frequently perforates the stomach. It also causes inflammation of the different coats of this viscus, and of the intestines.

The chemical tests of potash need hardly to be repeated in this place. They can seldom be successfully applied for its detection.

We may however remark, that syrup, tea, albumen, gelatine, milk and bile are not affected by it, while red wine passes to a green on the addition of a few drops of the solution. Fluid blood is not coagulated by it, nor indeed by any of the alkalies. They, on the contrary, prevent its spontaneous coagulation.

Antidote. Vinegar and lemon-juice are the most valuable remedies for this purpose, and their use should be aided by mucilaginous drinks.

The action of *soda* is precisely similar to that of potash, as is also the mode of treatment necessary to counteract its effects.

Ammonia, in its liquid state, is extremely caustic and pungent. When injected into the veins, it produces a stiffness, resembling tetanus, and violent convulsions. These were soon followed by death. When introduced into the stomach, fatal effects also ensued, and the mucous membrane of the stomach was found of a red colour throughout a part of its extent, but no ulceration or perforation was present.

Cases are mentioned where the fluid ammonia caused death in the human subject, within the space of a few minutes.† And in a late work, Orfila adds a caution against its too free use, with persons who have fainted. If inspired too long, the vapour inflames the throat and lungs, and destroys the individual.‡ The phial containing it should only be passed from time to time under the nose.

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* London Med. Repository, vol. 7, p. 118. † Orfila, vol. 1, p. 387.

‡ Orfila's Directions, p. 44. A case confirming this statement is mentioned in a late Journal. " A patient was recovering from a severe attack of fever; during convalescence, he was, without any evident cause, seized with convulsions apparently

Vinegar is here also the proper antidote, although, from the rapid action of the alkali, means are generally required in addition to this, to counteract the inflammation that frequently occurs.

BARYTES AND ITS SALTS.

These are all poisonous.* The muriate, however, acts more violently than either the pure or the carbonated barytes.

Barytes, whether pure or carbonated, when introduced into the stomach, produces vomiting, hiccup, insensibility, convulsions, and death. The stomach was found inflamed throughout its whole extent, and extravasations of black blood were seen near the pylorus. The lungs and intestines were natural.†

Mr. Parkes mentions, that he visited the mine of carbonate of barytes at Anglezark, in the county of Lancaster, and was informed by Mr. Derbyshire, who occupies the estate on which the mine is situated, that some years since, he lost three cows at one time, which had strayed from their pasture and were found licking some lumps of the spar, which at that time lay about the mouth of the mine in abundance. It was also stated, that it was impossible to keep any fowls upon the farm, as they mistook the barytes for white sand. They were sure to die on the first day that they got out upon the land. Mr. Parkes also adds the following quotation from Leigh's History of Lancashire: "Some have been hardy enough to take a drachm at one dose, particularly one James Barnes, wife, and child, and in about nine hours afterwards they expired. The like quantity, in about three hours, will kill a dog."‡

Muriate of barytes, when injected into the jugular vein, caused great agitation and convulsions, and death ensued in six minutes after the operation. On dissection, the heart was found distended with coagulated blood—the stomach was natural, while the lungs were crepitating, and rather denser than usual.

When applied to a wound in the state of powder, Mr. Brodie found that it produced vertigo, paralysis of the posterior extremities, general insensibility, dilated pupils, convulsions, and death. The stomach and intestines were not affected. The lungs were exactly in the same situation as in the previous experiment.

Orfila and Brodie have each introduced this substance into the

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of the epileptic kind, which became more and more frequent, and ultimately were so severe as to cause great apprehension of a fatal result. In order to rouse him from the stupor succeeding one of these fits, an attendant most imprudently held aqua ammoniæ to his nose, with such unwearied but destructive benevolence, that suffocation had almost resulted. As it was, dyspnœa, with severe pain in the throat, immediately succeeded, and death took place forty-eight hours afterwards. In the actual condition of the patient, there was little else than death to be expected, yet there is equally little room to doubt that the fatal event was hastened by this unhappy ministration."—Edinburgh Med. and Surg. Journal, vol. 14, p. 642.

* Except the sulphate, says Dr. Ure.—Dictionary of Chemistry, article BARIUM.

† Orfila, vol. 1, p. 396.

‡ Parkes' Chemical Essays, London, 1815, vol. 2, p. 217.

stomach of animals. It excited vomiting and purging, violent convulsions, and greatly accelerated the pulse. Insensibility generally ensued previous to death. The mucous membrane of the stomach was of a livid red colour, and it could be easily rubbed off. The muscular coat exhibited two broad patches of a cherry-red colour. The lungs were natural, but the left ventricle of the heart contained black fluid blood.*

We have also some instances of its effects on the human system. An over-dose (probably seventy or eighty drops) excited violent purging and vomiting, loss of muscular motion in the limbs, and coldness of the extremities, from which the patient did not recover in some days.† An ounce in solution, which was taken by mistake for Glauber's salts, produced instant vomiting, convulsions, pain in the head, and deafness, and death supervened within an hour after the exhibition of the poison.‡

Chemical Proofs.

Carbonate of barytes is insoluble in water, and effervesces when dissolving in the nitric and muriatic acids.

Muriate of barytes is soluble in water, and is decomposed by the carbonates of potash and soda. Carbonate of barytes is precipitated.

Nitrate of silver causes a precipitate of muriate of silver. The hydro-sulphurets do not effect its solution.

Wine is very slightly affected by the solution of the muriate. Syrup, tea, albumen, gelatine, and milk, are not altered; but human bile is precipitated of a greenish yellow.

Pure barytes acts in a similar manner on the above animal and vegetable substances.§

The chemical characters above stated, sufficiently distinguish the salts in question; but if they be mixed with fluids, which prevent the full action of the tests, the suspected substances must be treated with the sub-carbonate of ammonia dissolved in water. A precipitate of carbonate of barytes is thus obtained, which, after being dried, should be calcined with charcoal. Caustic barytes will thus be obtained.

The same direction also applies to cases were muriate of barytes is the supposed poison.

Antidotes. From the experiments of Orfila, it appears that the sulphate of soda or magnesia is the proper remedy, when early administered. These decompose the poison and produce an insoluble sulphate of barytes. Vomiting must always be encouraged.

QUICKLIME was introduced into the stomach of a small dog, to the extent of a drachm and a half in powder; it caused vomiting and the discharge of much saliva, with some pain. He, however, recovered on the next day. Three days thereafter, three drachms were administered. Vomiting and dejection ensued, and he died in three days, without having experienced either vertigo, convulsive motions, or paralysis.

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* Chaptal mentions, that MM. Huzard and Biron gave to some horses the muriate and carbonate of barytes in doses of 118 grains every day, and these animals died suddenly after having taken them for a few days.—Chemistry applied to the Arts, vol. 2, p. 74.

† Med. Commentaries, vol. 19, p. 151.

‡ Brande's Journal, vol. 4, p. 382.

§ Orfila, vol. 1, p. 390, 398.

The mouth, fauces, and œsophagus were slightly inflamed, and the mucous membrane of the stomach was inflamed throughout its whole extent. The intestines and lungs were natural.

Quicklime is thus evidently not a very powerful poison.

Its chemical characters are well known; but if any doubt exist, it must be calcined, in order to be reduced to a caustic state.

Wine changes lime-water to a yellow colour, and gives a brown precipitate. Tea, in a small quantity, gives a greenish precipitate, but when a large quantity of lime-water is added, the deposition is of a red ochre colour. Albumen, gelatine, and milk produce no change, but human bile deposits, after a few hours, a brown precipitate.

The same mode of treatment that was mentioned respecting persons poisoned by caustic potash and soda, is adviseable in this instance.[*]

HYDROGENATED SULPHURET OF POTASH. (*Liver of Sulphur.*) This substance, which formerly was deemed an antidote of arsenic and corrosive sublimate, has been ascertained to be one of the most powerful of the corrosive poisons. A French countess swallowed by mistake some of it, which was intended for the preparation of a bath, and she expired in a few minutes[†]

When introduced into the stomach of animals, whose œsophagus had been tied, it produced violent attempts to vomit, hurried respiration, panting tetanic convulsions, and death. The stomach was found much inflamed, and covered over with yellowish white spots; the duodenum and jejunum were inflamed; the lungs were partially gorged, and the left ventricle contained black blood. Vomiting was excited when the œsophagus was not tied.

When injected in solution into the jugular, it produced immediate tetanus, from which, in one instance, the animal quickly recovered, and in another, he perished. The blood in the heart was fluid, and in the left ventricle of a deep red.

The deduction drawn by Orfila from his experiments with this substance is, that the corrosion excited by it is slighter in proportion as the dose is stronger, and the nervous phenomena will then be much more severe.*

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[*] Orfila, vol. 1, p. 401.

[†] Orfila's Directions, p. 68. Probably this is the same case which is quoted from Dr. Montgarny's *Essai de Toxicoligie*, in the London Med. Repository, vol. 18, p. 511. "A lady suffering from pyrosis, died in a few minutes, after having swallowed a few mouthfuls of an aqueous solution of the sulphuret of potash. The fatal event was preceded by faintness, convulsions, and the issue of a yellowish froth from the mouth. On dissection, the stomach was found very much contracted, its internal membrane lined with sulphur, and of a brightish red colour, and its capillary system, in some points, minutely injected. The duodenum was red and inflamed, particularly towards its duodenal extremity. The superior portion of the small intestine, in about a fourth of its extent, presented the same appearances. The membrane of the mouth, pharynx, and bronchiæ was whitish and coloured, but displayed no change of structure. The lungs were soft, not crepitous, and gorged with black, livid, and very fluid blood."

Liver of sulphur is decomposed by the acids, and sulphuretted hydrogen is given out. Corrosive sublimate, acetate of lead, nitrate of bismuth, and the salts of copper, all yield a black precipitate on the addition of a few drops of this substance. Tartar emetic, an orange-yellow one, and arsenious acid, applied to a small quantity, a white precipitate; to a large quantity, a yellow one.

Treatment. Vinegar, or lemon-juice, mixed with water, should be administered. This excites vomiting, and may decompose the poison. We should then guard against inflammation.†

NITRATE OF POTASH. (*Nitre, Salt-petre.*)

This salt, in large doses, acts as a corrosive poison, and cases illustrative of this effect are mentioned by various writers. An individual labouring under fever, took by mistake an ounce and a half of nitrate of potash. In a short time, severe anguish, with a sense of internal cold, supervened, and fainting and syncope followed. He died in less than ten hours.‡

A female took an ounce and a half by mistake. It excited vomiting and purging, with violent pain in the bowels. The extremities were cold, while a burning sensation was experienced in the stomach; the pulse was almost imperceptible, and she died in sixty hours after taking the salt. On dissection, the stomach was found red, and scattered over with blackish spots, and in the centre was a small hole, which perforated it. The intestinal canal was reddish.§

In a third case, related by M. Laflize, an ounce produced similar effects, and death in three hours. The stomach was very highly inflamed, and its mucous coat detached in several places; the external coat was of a deep red, and some brown spots were observed on it.‖

There are, however, some instances where patients have recovered, after taking large doses. A pregnant female by mistake took two ounces, which immediately excited vomiting, first of the contents of the stomach, and then of blood. As soon as the alarm was taken, warm water and mucilaginous drinks, (gum arabic, linseed tea, &c.) were exhibited. Burning pains at the stomach, however, supervened; the pulse sunk, and a cold clammy sweat broke out. The vomiting recurred frequently with violence. From this she was gradually relieved, but the pains in the abdomen continued for a longer time; and when convalescent, and ten days after the taking of the salt, she was seized with a nervous affection, greatly resembling chorea. Twitchings of the muscles and involuntary motions were present, to an alarming degree, and they continued for two months. They gradually left her, and she was at last happily delivered.*

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* He adds, that Magendie has observed, that when a drop of a strong solution of liver of sulphur is put into the mouth of a very young dog, the animal dies in a short time, and after death the trachea is filled with mucus.

† Orfila, vol. 1, p. 508. Orfila's Directions, p. 68.

‡ Quoted from Comparetti. Orfila, vol. 2, p. 87.

§ Case by Souville. Orfila, vol. 2, p. 87.

‖ See Foderè, vol. 4, p. 82. Metzger, p. 385; and Belloc, p. 141, refer to several cases where nitre has proved poisonous.

Effect on animals. Five drachms and a half given to a dog caused vomiting, but on the day following he ate well, and experienced no remarkable symptoms. But when the œsophagus was tied, and the salt introduced into the stomach, it excited vertigo, pain, slight convulsions, insensibility, weakness, and death. The mucous membrane of the stomach was inflamed, and scattered over with black spots. The lungs were natural.

When nitre in powder was applied to a wound on the back of a dog, it produced no effect. But an application of it to an incision near the femoro-tibial articulation, produced gangrene, after some days, and the animal died.†

The distinguishing properties of nitre are, its crackling when thrown on burning coals, and the disengagement of white vapours when sulphuric acid is added.

The treatment employed in the case already related, is probably the most advisable. Vomiting should be excited while the stomach is protected by mucilaginous drinks.

Muriate of ammonia, *(Sal Ammoniac,)* is poisonous when taken into the stomach, or applied in large quantities to wounds. It causes vomiting, convulsions, pain in the bowels, and death. Dr. Smith applied it to the cellular texture of the thigh of dogs; vomiting ensued, with great weakness, which increased until death. The mucous membrane of the stomach presented several gangrenous ulcerations, and was generally inflamed; the whole digestive canal contained a blackish fluid, and the rectum was inflamed. In another instance, the mucous membrane was found in a state of putridity.‡

Treatment. Vomiting should be excited by warm water, or irritating the throat, and the nervous or inflammatory symptoms are then to be counteracted by the means already noticed.

GASES.

Several of these have been made the subject of experiment on animals, while, in some instances, they have unfortunately proved destructive to human life.

Chlorine, in a gaseous state, destroys those who breathe it, by producing great irritation of the bronchiæ; and even when diluted with atmospheric air, it causes cough and inflammation. Pelletier is thus said to have fallen a victim to its effects.

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* Case by Mr. Butter, in Edin. Med. and Surg. Journal, vol. 14. p. 34. This gentleman observes, that he is not aware of any case on record where a patient has taken and recovered from so large a dose of nitre. There is, however, another in the memoirs of the Medical Society of London, related by Dr. Falconer, vol. 3, p. 527. The individual, (a blacksmith) took two ounces, and his symptoms were similar to those already detailed, except that he vomited blood to the amount of a quart. He was ill for many months afterwards, and was not dismissed cured from the hospital until nearly a year after the accident. Other cases of recovery are cited by Orfila.

† Orfila, vol. 2, p. 84.

‡ Ibid. vol. 2, p. 469.

In the summer of 1821, Dr. Francis was called to a child aged seven years, who had, through accident, inhaled a portion of this gas from a bottle. The action of this substance was most sudden—immediate congestion of the bronchiæ and lungs, a laboured cough, and appearance of unavoidable suffocation. The patient was forthwith removed into the open air, and blood taken from the arm. These means were followed by the mechanical elevation and depression of the ribs, as in giving action to the chest in cases of asphyxia. Considerable irritation of the lungs continued for several days after the child's recovery.*

Nysten and Orfila have performed several experiments with gaseous chlorine on animals. When injected into the jugular, it caused pain, difficult breathing, and speedy death; and the blood, on examination, was dark-coloured, and altogether fluid. The injection of it into the pleura excited great agitation, extreme pain, and trembling of the limbs; but the animal survived the immediate effects. On the third day he was killed, and the pleura was found covered with a false membrane, and bore all the appearances of recent inflammation.†

Fluid chlorine, when introduced into the stomach, caused dejection and death; and, on dissection, the mucous membrane of the stomach was either extensively inflamed or ulcerated. The other organs were unaffected. It is hence evident, that its action resembles that of the other acids.

Nitrous acid gas, or more correctly, *nitric acid gas.* Dr. Desgranges has presented a valuable case, illustrative of the effects of this substance on the animal œconomy.

A merchant at Lyons, aged 45, and of a tolerably strong constitution, had stored a considerable quantity of nitrous acid in his warehouse. He was awoke one morning by the howling of the watch-dog, which he had shut up in it, and on opening the door, immediately perceived the smell of nitrous gas. The dog rushed out, with his paws burnt, ran to the nearest water to quench his thirst, and after playing an hour or two with some other dogs, he returned, and expired at his master's door, after vomiting thick stuff, of various colours.

The merchant attempted to enter the warehouse, but was driven back in a few minutes by the approach of suffocation. He, however, persisted in again visiting the room, and finally succeeded in carrying out the broken cantines. Two were found empty, each of which had contained thirty-two pounds of aqua fortis.

This was early in the morning. At six o'clock he breakfasted, and then went to pay a visit, but returned before eight, with a dry and burning heat in the throat, irritation in his stomach and breast, and a very painful sense of tightness near the attachment of the diaphragm. He was advised to drink freely of milk, and fomentations were applied to the abdomen, together with sinapisms to the arms. The two last remedies seemed to fatigue him much, and to augment his distress, but he continued the milk. At one o'clock he felt easier, had a spontaneous yellow stool, and in the space of an hour two others, both of the colour of citron ointment. His urine was scanty, and in the evening he experienced frequent pressing desire to make water, but always in vain. At four o'clock he began to expectorate a yellowish matter, and had afterwards a little cough and slight vomiting. Injections were given him, which came off instantly, but coloured yellow. At nine his body became of a blue colour, his breathing was oppressed, there was some rattling in the throat, and hiccup, and he complained of great pain in the abdomen and across the bottom of the thorax. Convulsive motions and slight delirium also supervened. Towards morning his anguish increased, and his anxiety became inexpressible. He, however, preserved his senses until six, and died at seven o'clock. Shortly after death his belly swelled, and became distended in a very remarkable manner; his face was purple, his lips black, and some blood issued from his nose and mouth. The body was not opened.*

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* MS. Communication.

† Orfila, vol. 2, p. 92.

There is also a curious case related in the Philosophical Transactions, by Dr. Mounsey, where a long train of symptoms afflicted an individual at Moscow, apparently from inhaling the fumes of a mixture of verdigris and false gold leaf with nitric acid. Red spots appeared on various parts of his body—nausea, pain, and anxiety at the pit of the stomach came on, and it was not until after several days that he was relieved from the pains in various parts of his body.†

Sulphurous acid gas. This is constantly disengaged when sulphur is burnt in the open air. It is also produced by the roasting of various metals.

In March, 1817, a number of miners at the Lead-hills, in Scotland, who had gone down to work at the depth of twenty-five fathoms, were suddenly seized with difficulty of breathing, violent pain in the head, weakness of the lower extremities, palpitation, and in some cases vomiting. Giddiness ensued, and in a short time complete mania. Some were furious, and others listless, or appeared as if they were intoxicated. Vomiting or retching generally came on, when they had been exposed for sometime to the air above-ground; and in other cases, tenesmus was present. By the use of emetics or purgatives, as the symptoms indicated, they were relieved, and recovered in the course of a few days. Two, however, who could not be brought up, were deprived of life.

The accident in this instance was attributed to a quantity of smoke escaping from the chimney of the engine under-ground, into the waygates, and so contaminating the air in the workings, from the sulphurous acid gas which it contained, as to render it deleterious. It evidently was but slightly charged with carbonic acid gas, since the candles burnt, though faintly, at the place where the men perished.‡

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* Edinburgh Med. and Surg. Journal, vol. 3, p. 16.

† Phil. Trans. vol. 50, p. 19; and vol. 54, p. 15.

‡ Edin. Med. and Surg. Journal, vol. 13, p. 358; case by Mr. Braid, surgeon. Water, on being thrown down the shaft, improved the air so much, probably by absorbing the sulphurous acid gas, that one person, who had lain insensible for an hour at the side of the shaft, was restored.

In the following instance, I also apprehend, that sulphurous acid gas was the main cause of death.

In November, 1821, a smith, at Maidstone, was repairing the inside of the boiler of a steam-engine, and in joining two pieces of iron, he made use of a cement composed of sal-ammoniac, sulphur, and iron turnings, which produced such a quantity of fumes, that he was suffocated in a few moments. His assistant being at work on the outside, and hearing a struggling noise within, got through the opening at the top of the boiler, and while descending to his master's assistance, inhaled the fumes, and fell to the bottom. A workman attempted twice to descend to his assistance, but he was so powerfully affected by the effluvia, that he was obliged to desist. A large quantity of water having been thrown into the boiler, the bodies were brought out. The master was quite dead, and his assistant, though he exhibited some signs of life when taken out, died next morning.*

Nitrogen is classified by Orfila among the narcotic poisons. Animals, when plunged into it, experience a difficulty of respiration, which gradually becomes more rapid and weaker, but without any lesion of the nervous functions. Life is, however, readily restored by exposure to the atmosphere.

Dupuytren has ascertained that this gas is one of the causes of the asphyxia arising from privies.†

Carbonic oxide. This forms a part, as we have already stated, of the deleterious gases arising from the burning of charcoal. There are, however, one or two facts on record of its influence when prepared in the laboratory.

Sir Humphrey Davy inspired it, in a state of mixture, with about $\frac{1}{4}$ of common air. The effect was a temporary loss of sensation, which was succeeded by giddiness, sickness, acute pains in different parts of the body, and extreme debility. Some days elapsed before he entirely recovered.‡

Mr. Witter, of Dublin, desirous of fully ascertaining the effects of carbonic oxide, when freely inhaled, took three or four full inspirations of it. The consequence was an inconceivably sudden deprivation of sense and volition. He fell supine and motionless on the floor, and continued in a state of total insensibility for almost half-an-hour, and apparently lifeless, as pulsation was nearly extinct. Various restorative means were used without success; but, on the introduction of oxygen gas into the lungs, he recovered with convulsive agitation, excessive head-ache, and quick irregular pulsation; and for some time after mental recovery, total blindness, extreme sickness, and vertigo, were experienced. An unconquerable propensity to sleep succeeded, after which he gradually recovered.§

The following curious fact has also been considered as illustrative of the effects of the carbonic oxide. I quote it for its singularity, although I am not satisfied but that other causes may have aided in producing the disease.

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* Edinburgh Philosophical Journal, vol. 6, p. 402, from the Technical Repository.

† Orfila, vol. 2, p. 168.

‡ Davy's Elements of Chem. Philosophy, p. 172. Amer. edit.

§ Eclectic Repertory, vol. 5, p. 540.

"The workmen of a cotton manufactory at Arguea, near Dieppe, were attacked with nausea, vertigo, and convulsions, which so much affected their imaginations, that they thought they saw spectres and other fantastic objects flying at them, and seizing them by the throat. Mr. Nicholle, an apothecary at Dieppe, published a memoir on this disease, and he attributes it to the gaseous oxide of carbon, resulting from the decomposition of the oil, by the heat of a cast-iron stove, on which they were in the habit of placing their vessels of that fluid. This gaseous product being lighter than the atmosphere, would ascend, and in this way he accounts for the fact, that the persons in the upper stories of the manufactory were first affected, while those on the ground-floor were generally preserved from it."[*]

Another substance remains to be noticed, and principally for the purpose of establishing its *innoxious* properties. I refer to

GLASS AND ENAMEL IN POWDER.

This was formerly deemed a highly poisonous substance. It was one of the articles administered to Sir Thomas Overbury for his destruction, and toxicologists and medical jurists, even to the present day, continue its arrangement with the corrosive poisons. Various experimenters have, however, given it in considerable quantity to animals, and even to men, without producing any injury. Le Sauvage administered several drachms to cats, dogs, and rats, and neither, during life, was any illness perceived, nor, on being killed for the purpose of dissection, was any lesion noticed in the stomach or intestines. Caldani and Mandruzatto are also said to have made similar experiments on animals, and the latter on himself, with the same results.[†] It would thus seem, that the substance in question can hardly be deemed a poison, at least in the ordinary sense of the term. But there is no doubt, that it may produce injury by its insolubility, and its mechanical properties. If the fragments be coarse or large, inflammation may arise from the irritation that is excited.[‡]

There is a remarkable case on record, where a husband was accused of having poisoned his wife by means of this substance, and as the question in controversy was referred to two eminent physicians, I conceive I shall do a service, in giving the leading particulars, and their decision.

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[*] Silliman's Journal, vol. 6, p. 199.

[†] Orfila, vol. 1, p. 418. Marc, p. 61. Le Sauvage also made numerous experiments on himself, with pounded glass, but *no inconvenience or injury was produced.*—See the New-York Med. Repository, vol. 14, p. 406, for a statement of his experiments.

[‡] Foderè, vol. 4, p. 115; and Marc, p. 61, appear to consider it a poison. Metzger observes, "La similitude d'action du verre en fragmens grossiers, et de tous les corps siliceux m'engage encore à les placer dans cette classe," (des poisons caustiques,) p. 121. A remark of Foderè, though not in the way he intends it, may be applied to this substance. If glass in fragments be poisonous, a fish-bone irritating the stomach or intestines, may, with the same propriety, be called poisonous.

Louis Lavalley, a young man residing near Bayeux, in France, became attached to Maria Guerin, the daughter of a neighbour. After the intimacy had continued for some time, it was discovered that she was pregnant, and her relatives urged the necessity of marriage. As Louis continued deeply enamoured of the female, but little difficulty was experienced in effecting this, and his parents readily consented to the union. They were married on the fifth of November, 1807, but were to remain separate at the request of the family of Guerin, until after her delivery.

On the thirteenth of December, Lavalley invited his wife and father-in-law to a family-dinner. The entertainment consisted of roast pig, black pudding, and calf's liver, and the bride partook freely of all of them. To these, coffee succeeded, and she mixed a little brandy with her's. She was urged to remain that evening, but her father opposed it, and she returned to his home with him. She continued well during the night, but early on the next morning was seized with violent pains, and in four or five hours convulsions followed. Medical aid was afforded, but without relief. Delivery with instruments was then attempted, but an alarming hæmorrhage obliged the accoucheur to abandon it, and finally, as death seemed inevitable, the infant was extracted by the cæsarean operation. She died during this, and her infant did not survive her. The funeral took place as usual; but about a month after her decease, and after some disagreement had taken place among the families, concerning the disposition of her marriage-settlement, a report came into circulation that she had been poisoned, and her husband was named as the murderer. The body was disinterred, forty-two days after death, and although putrefaction was greatly advanced, yet the stomach and other viscera were removed and carried away for examination.

The reports made concerning the dissection, were as follow: The stomach, duodenum, ileon, and rectum, on being opened, exhibited numerous black points and spots. On the internal coat of the intestines a whitish substance was discovered, which was ascertained, by the magnifying glass and chemical experiments, to be *pounded glass*. Vesicles resembling the effects of a burn were also present, and particularly in those places where the black spots were most numerous, and some slight erosions were observed. On these grounds, the surgeons and chemists gave it as their opinion, that the pounded glass hadprolduced the symptoms, and the fatal termination.

Lavaley was dragged to prison, with every mark of opprobrium. His advocate, however, addressed several questions to the president of the school of medicine, for the purpose of elucidating the medical testimony. And these were answered by two of the professors, whose names are well known throughout the medical world—Baudelocque and Chaussier. Their report is dated March, 1808. After stating the questions put to them, I shall detail the substance of their answers.

The first Interrogatory was, whether, from the facts stated above, there appeared to be any natural causes for the death of the female, either as regards her situation, the food she had taken, the medical assistance she had received, or the omission of proper remedies?

To this, it is replied, that the nature of the food taken by the female being rather indigestible, the addition of brandy to her coffee, and her subsequent walk, all might have aided in producing indigestion—that this is a common occurrence from any impropriety in eating, with females advanced in pregnancy, and that convulsions are, in these cases, a common consequence of indigestion. As to the treatment, they decline any observations, but intimate an opinion, that the attempted delivery with instruments when no dilatation was present, as well as the cæsarean operation, were both improper.

The second question was, whether her death ought to be attributed to the pounded glass found in the stomach and intestines—whether this glass is a poison, and if so, what are its effects, and mode of operation, and do these correspond to the appearances observed on dissection?

The professors intimate a doubt, whether the substance found was actually glass, but admitting it was so, they proceed to examine its nature. They observe that it is a common and ancient opinion, that rock crystal, the diamond, glass, and other analogous substances, are active and dangerous poisons, since, by their hardness, they tear and pierce the coats of the intestines. This belief, however, is shown to be totally incorrect, by numerous quotations from various authors, of persons who had swallowed diamonds, and of eaters of glass, in large pieces—all of whom had escaped injury. They declare, that glass, in a state of fine powder, is an inert substance, and particularly so when the stomach is filled with food. The idea of its being taken in the coffee, is at once refuted by the fact, that it would fall to the bottom by its own gravity; and it is suggested, whether if glass were actually present in the intestines, it might not have come from some vessel which she had broken with her teeth during the existence of the convulsions.

The last question was, whether putrefaction would not produce great changes in a body, forty-two days after death; and, if so, what caused the state of the viscera as reported by the examiners?

It is replied, that usually the term of forty days produces such a change as to render an examination altogether uncertain, but even allowing the season to have been favourable for the preservation of the body, they do not conceive the facts stated to indicate the results of poison. Convulsions supervening on a full stomach, and passing to a fatal termination, would leave an engorged state of the vessels in various parts, and predispose to ecchymosis, while the progress of putrefaction would readily explain the black spots that were observed. The medicines administered being antimonial emetics, and an enema of senna, must also, and particularly as they proved inefficacious, have aided in determining the irritation to the stomach and bowels. As to the erosions, they remark, that their appearance proves little, since they are frequently observed in those who die from diseases which exclude all idea of poison.

The professors conclude with observing, that as natural causes will abundantly account for the death of the female, they consider the accused husband as guiltless; and when brought to trial before the criminal court of Caen, he was acquitted by the *unanimous* verdict of the jury.*

I shall conclude this chapter with a statement of some general results drawn from experiments on the principal poisonous minerals. These, I should presume, would often prove of great assistance in guiding the examinations of the medical jurist.

We shall first suppose that the poison discovered is solid; and the earliest subject of enquiry in that case, is its solubility. We may attempt this in cold water, but generally it will be most satisfactory in boiling water, and the process should be continued for at least a quarter of an hour. In both instances distilled water should alone be used. The following table indicates the substances which will, or will not, be dissolved:

Substances soluble in water, wholly or in part.

Corrosive sublimate.
Arsenious acid.
Muriate of antimony.
Sulphate, muriate, and nitrate of copper.
Muriate of tin.
Sulphate of zinc.
Nitrate of silver.
Muriate of gold.
Nitrate of bismuth.
Potash: sub-carbonate of potash.
Soda: sub-carbonate of soda.
Sub-carbonate of ammonia.
Barytes: muriate and nitrate of barytes.
Lime.
Nitrate of lead.
Nitrate of potash.
Sulphate of iron.
Muriate of ammonia.
Sulphuret of potash.

Substances insoluble.

Red precipitate of mercury.
Black oxide of mercury.
Turbith mineral.
Red and yellow sulphurets of arsenic.
Peroxide of antimony.
Golden sulphur.
Kermes.
Peroxide of tin.
Oxide of zinc.
Sub-nitrate of bismuth.
Carbonate of barytes.
Carbonate of lead.
Cinnabar.

Having determined the fluid to be SOLUBLE, it is filtered, and a small quantity is put in a test glass. To this, a few drops of a hydro-sulphuret are added, and the effects will be as follows:

Substances precipitated by the hydro-sulphurets.

Corrosive sublimate—black.
Muriate of antimony—orange or red.
Soluble salts of copper—black.
Muriate of tin—black or chocolate, or yellow.
Sulphate of zinc—yellowish white, or deep brown.
Nitrate of silver—blackish brown.
Muriate of gold—deep chocolate.
Nitrate of bismuth—black.
Sulphate of iron—blackish green.
Nitrate of lead—black.

Substances which are not precipitated by the hydro-sulphurets.

Arsenious acid.
Potash, and its sub-carbonate.
Soda, and its sub-carbonate.
Barytes, and its muriate and nitrate.
Lime.
Nitrate of potash.
Muriate of ammonia.
Sulphuret of potash.

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* Causes Célèbres, par Mejan, vol. 2, p. 324 to 366; vol. 3, p. 344.

A fresh quantity of the original fluid should now be taken, and submitted to the action of caustic alcoholized potash. And the following is the effect on those solutions which are precipitated by the hydro-sulphurets:

Solutions which yield a white precipitate with caustic potash.	*Solutions which yield with potash coloured precipitates, or are not precipitated at all at the ordinary temperature.*
Muriate of antimony.	Corrosive sublimate—canary yellow.
Muriate of tin.	Salts of copper—blue.
Sulphate of zinc.	Nitrate of silver—deep brown.
Nitrate of bismuth.	Muriate of gold—no precipitate when cold.
Nitrate of lead.	Sulphate of iron—green or red.

We have now obtained two results with the substances in the right-hand column, (with the hydro-sulphurets and the caustic potash.) These are sufficient indications to guide the examiner in his investigations, and he must refer to the head of chemical proofs, as given under each individual poison, for additional verification.

Of those substances which give a white precipitate with caustic potash, one, the nitrate of lead, is precipitated by the muriatic acid; the others are not affected by it. We have then four remaining. Two of these give a white precipitate, or become milky with distilled water, viz. muriate of antimony and nitrate of bismuth; while the remaining two, being muriate of tin and sulphate of zinc, undergo no alteration from it. Each of these must then be examined by additional tests, as directed in former pages.

We return to the substances that have not furnished any precipitates with the hydro-sulphurets; and they are divisible as follow:

Substances which turn the syrup of violets green.	*Substances which do not.*
Potash: sub-carbonate of potash.	Arsenious acid.
Soda; sub-carbonate of soda.	Muriate and nitrate of barytes.
Sub-carbonate of ammonia.	Nitrate of potash.
Barytes.	Muriate of ammonia.
Lime.	

Among those which have turned the syrup of violets green, the sub-carbonate of ammonia may be readily distinguished by its smell, and of the remainder, barytes and lime are precipitated by the sub-carbonate of potash, while the others are not precipitated by it. Barytes may then be distinguished from lime, by the addition of sulphuric acid. This re-agent precipitates the former, and not the latter. Potash and soda are to be distinguished by the nitro-muriate of platina.

Of those which have not turned the syrup of violets green, one precipitates hydro-sulphuretted water and lime-water of a yellow and white colour, viz. the arsenious acid. The others are not affected. Then add sub-carbonate of ammonia to them. It

Precipitates	*And does not precipitate*
The soluble salts of barytes;	Nitrate of potash,
	And muriate of ammonia.

If we add lime to the muriate of ammonia, the disengagement of ammonia will indicate its nature.

We come next to that class of substances which were INSOLUBLE in distilled water. The colour should first be noticed.

Poisonous substances insoluble of a white colour.	*Insoluble poisonous substances, coloured.*
Peroxide of antimony.	Red precipitate of mercury.
Peroxide of tin.	Black oxide of mercury.
Oxide of zinc.	Turbith mineral, yellow.
Sub-nitrate of bismuth.	Sulphurets of arsenic, yellow or red.
Carbonate of barytes.	Kermes, brown-red.
Carbonate of lead.	Golden sulphur of antimony.
	Cinnabar.

Treat the white substances with nitric acid—

It dissolves		*It does not dissolve*
Oxide of zinc.	without effervescence.	Peroxide of antimony.
Sub-nitrate of bismuth		Peroxide of tin.
Carbonate of barytes.	with effervescence.	
Carbonate of lead.		

On the solution that has dissolved without effervescence, pour some distilled water. If it be bismuth, there will be a white precipitate, while the nitrate of zinc will be unaffected. To the solution that has dissolved with effervescence, add pure ammonia. The lead will furnish a white precipitate, while the barytes remains transparent. Lastly, the antimony and tin must be treated with muriatic acid, and the muriate of tin thus procured will not be disturbed by distilled water, but the muriate of antimony will yield to it an abundant white precipitate.

Four of the coloured substances are red—red oxide of mercury, cinnabar, red sulphuret of arsenic, and kermes mineral. The red oxide and the kermes dissolve in muriatic acid; the others do not. Their nature, and those of the remaining substances, may then be investigated by the directions already laid down.

When the poison is in a fluid state, the same course should be pursued as directed concerning soluble solid substances.*

As to the punishment of murder by poisoning, it is not necessary for me to enlarge. It is sufficient to state, that in all civilized countries, it is deemed the most atrocious of crimes, and is marked by the severest punishment.† With respect to time, it is deemed murder in England, if the party poisoned die within a year; and in the state of New-York, it is enacted, that the punishment for poisoning, where the individual poisoned does not die within a year and a day, shall be imprisonment in the state-prison for a term not exceeding fourteen years.‡ I cannot find a provision on this point in the laws of other states.

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* The above directions are taken from Orfila, vol. 2, p. 502 to 512. Marc, (p. 74 to 78,) has drawn up a sketch somewhat similar, but not by any means so complete, as the one here presented.

† Ehrmann in Schlegel, vol. 3, p. 168 to 186, has collected the laws of various countries on this crime.

‡ Revised Laws, vol. 1, p. 409.

CHAPTER XVIII.

VEGETABLE POISONS.

1. Irritative or acrid poisons—Veratrum album—viride. Helleborus niger—fœtidus. Bryonia dioica. Elaterium. Colocynth. Gamboge. Daphne gnidium—mezereum—laureola. Ricinus communis. Euphorbia officinarum, and other species. Savine. Rhus radicans—toxicodendron—vernix. Anemone pulsatilla, and other species. Aconitum napellus, and other species. Œnanthe crocata—fistulosa. Ranunculus acris, and other species. Colchicum autumnale. Chelidonium majus—glaucium. Delphinium staphysagria. Narcissus pseudo-narcissus. Gratiola officinalis. Jatropha curcas—manihot. Scilla maritima. Sedum acre. Rhododendron chrysanthum—ferrugineum. Fritillaria imperialis. Pedicularis palustris. Cyclamen europæum. Plumbago europæa. Scammony. Cerbera. Cynanchum. Lobelia syphilitica—longiflora—inflata. Apocynum. Asclepias. Hydrocotile vulgaris. Clematis vitalba, and other species. Pastinaca. Sælanthus. Calla palustris. Phytolacca decandra. Croton tiglium. Various species of Arum. Equisetum hyemale. Oil of tansy. Symplocarpus fœtida. Treatment of persons who have taken these poisons. OXALIC ACID. Symptoms—appearances on dissection—effect on animals—tests—antidotes. Tartaric and citric acids. 2. Narcotic poisons. Opium—its compound nature—symptoms—effects, even in small doses, on children—appearances on dissection—effects on animals—treatment. Hyoscyamus niger—albus, and other species. PRUSSIC ACID. Symptoms—effects on animals—tests—treatment. Plants which contain prussic acid—laurel water—case of Sir Theodosius Boughton—bitter almonds—kernels of the peach. Lactuca. Solanum. Taxus baccata. Actæa spicata. Physalis somnifera. Azalea pontica. Peganum harmela. Ervum ervilia. Lathyrus cicera. Paris quadrifolia. Gelseminum nitidum. Treatment. 3. Narcotico-acrid poisons. Atropa belladonna. Datura stramonium, and other species. Nicotiana tabacum. Digitalis purpurea. Conium maculatum. Cicuta virosa—maculata. Brucea antidysenterica. Laurus camphora. Cocculus indicus. Poisonous mushrooms—their characters—symptoms—appearances on dissection. Alcohol. Sulphuric æther. Ergot. Lolium temulentum. Diseased wheat. Anagallis arvensis. Aristolochia clematitis. Æthusa cynapium. Ruta graveolens. Nerium oleander. Mercurialis perennis. Chærophyllum sylvestre. Sium latifolium. Coriaria myrtifolia. Upas Tieutè—Upas antiar. Strychnos nux vomica. Strychnos ignatia. Ticunas. Woorara. Hippomane mancinella. Curare. Calidium seguinum. Ava. Spigelia marilandica. Kalmia latifolia. Sanguinaria canadensis. Treatment.

We come now to the consideration of a class of poisons which present much greater obstacles to their discovery, than the one we have already considered. " So far as we know, there are no tests by which vegetable poisons can be detected, and their effects on the primæ viæ cannot in most cases be distinguished from those produced by various diseases." The symptoms are hence the leading guide in our investigation.*

As the deleterious substances belonging to the vegetable kingdom are very numerous, it will greatly facilitate the investigations of the student, as well as aid the practitioner, to divide them according to their characteristic effects. And in doing this, I shall pursue the classification proposed by Orfila. Whatever may be its defects as a general system, yet, as to this particular division, it is an approach to the truth, and in many respects is unquestionably the best yet offered. I shall therefore divide vegetable poisons into three classes—the irritating, corrosive, or acrid—the narcotic or stupifying—and the narcotico-acrid.

In proceeding to the consideration of individual substances, I will barely remark, that I shall study conciseness as much as possible; and while I shall notice all cases, illustrating their effects on the human system, and on animals, will omit, except in remarkable instances, the symptoms and appearances produced by their introduction into the veins. A detail of these is evidently not important in the present work. There is also another consideration, which will warrant a due degree of brevity: *Vegetable poisons are seldom the instruments of murder.* When death is produced through their operation, it generally originates from suicide or accident, and the coroner therefore is the only legal officer whose examination is required.

1. IRRITATIVE OR ACRID POISONS.

Veratrum album. (White hellebore. Indian poke.) The root of this plant has long been distinguished for its poisonous qualities. Etmuller states, that when applied to the abdomen, it produces violent vomiting, and the same phœnomenon has been observed, by Schroeder, when it was used as a suppository. Internally, it produces spasms, suffocation, loss of voice, and coldness over the body. Vicat relates the case of a family, who took some soup in which the root of white hellebore had been put instead of pepper. Shortly after, they were seized with a general coldness, and their bodies became covered with an icy sweat. Debility and an almost imperceptible pulse succeeded, and they were not relieved until vomiting came on. The root when powdered is a powerful errhine.

When administered to dogs, it produced violent vomitings and debility, and when the œsophagus was tied, there was violent straining, dejection, vertigo, and finally death. On dissection, the mucous membrane of the stomach was seen red, but not ulcerated. The other parts were natural. On inserting the root in powder into a wound on the thigh of a dog, similar symptoms were produced, accompanied with dilatation of the pupils, and the stomach after death presented the same appearance as in the previous instance.*

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* It sometimes happens, however, that portions of the vegetable poison are either rejected by vomiting, or discovered in the stomach after death. In these instances, it must always be proper to reduce it by chemical analysis to its proximate principle, and particularly if the body in question is suspected to belong to that class in which vegetable alkalies have been detected.

Veratrum viride of Aiton and Willdenow, is a native of New-England, and is said to have produced dangerous and even mortal effects. The root is bitter, nauseous, and acrid, and burns the mouth and fauces.†

Helleborus niger. (Black hellebore.) Morgagni mentions a case, where an individual, under cure in the hospital, took about half a drachm of an extract made with water from the roots of this substance. He was seized with pain and vomiting, and died in eight hours. On dissection, the whole digestive canal was found inflamed, and the larger intestines more so than the smaller. There was, however, no gangrene, and the limbs continued flexible for some time after death.‡

Two cases of poisoning with this substance have lately been communicated to the *Societé Medicale d'Emulation* at Paris, by M. Ferrary. A domestic took a decoction of the root in some cider, at the recommendation of an empiric, and his master, from curiosity, swallowed a like dose. In about three quarters of an hour alarming symptoms were developed, without, however, exciting suspicion of their real cause. Another glass-full was taken by the servant, when vomiting, delirium, horrible contortions, accompanied with immediate coldness, supervened, and death at last ensued. The violence of the symptoms were proportioned to the quantity taken. The master died in two hours and a half, and the servant in one hour and three quarters after its injection. On dissection, sixteen hours afterwards, the appearances in each were found precisely similar, except that in the domestic they were more strongly marked. The lungs were gorged with blood. The mucous membrane of the stomach was considerably inflamed, of a blackish brown colour, and reduced to an almost gangrenous state. The œsophagus and intestines were natural.§

In animals, this produces vomiting, or attempts to vomit, great debility, vertigo, insensibility, and great torpor, and finally death; and this, if the dose be large enough, whether taken internally, or applied to a wound. The stomach and intestines, and particularly the rectum, are found inflamed; and, in one instance, the mucous membrane was ulcerated. Slight congestions have also been noticed in the lungs, and the bladder has been observed red and thickened.*

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* Orfila, vol. 2, p. 3 to 6. Pelletier and Caventou have discovered in this plant a new alkaline principle, which they denominate *Veratrine*. It has also been detected in the seeds of the *veratrum sabadilla*, and the root of the *colchicum autumnale*. It is endowed with excessive bitterness; excites, even in minute doses, violent vomiting, and a few grains destroy the life of animals.—Brande's Journal, vol. 10, p. 171. London Med. Repository, vol. 14, p. 427.

† New-England Journal, vol, 3, p.335. Bigelow's Med. Botany, vol. 2, p. 125.

‡ Morgagni, vol. 1, epist. 59, p. 392.

§ London Med. Repository, vol. 10, p. 424. "As this was a quack remedy, it is *possible* that some mineral poison may have been mixed with the hellebore."

Helleborus fœtidus is also said to have caused the death of a child, who ate its root in the pulp of an apple.†

Bryonia dioica. (Bryony.) The administration of bryony root has caused vomiting, fainting, violent pain, profuse alvine evacuations, &c. When administered to dogs, in whom the œsophagus was tied, death ensued without any previous remarkable symptom, but the mucous membrane of the stomach was of a bright red, and the great intestines were highly inflamed.‡

Momordica elaterium. (Wild or squirting cucumber.) The expressed juice of the fruit of this plant, on standing, deposits a substance which has been variously styled an inspissated juice, a fecula, and an extract, but is strictly speaking neither of them. It is dried, and in that state forms the medicinal article. Among cathartics, to which class it belongs in the materia medica, it is deemed the most violent, and indeed the severity of its operation is such, that it has for a long time been banished from the practice of medicine. As its active principle is now however beginning to be better understood, it is probable that it may again resume its place as a drastic purgative of great power.

Elaterium, when given to the amount of three drachms to a dog, whose œsophagus had been tied, produced nausea and efforts to vomit, moaning, insensibility and death. The mucous membrane of the stomach was found highly inflamed, as was also the rectum, but the other intestines were not altered. Similar effects were produced by inserting the extract into a wound. § Drs. Clutterbuck and Paris have particularly examined the nature of this substance. The former ascertained " that the active principle of the plant is neither lodged in the roots, leaves, flowers, or stalks, in any considerable quantity; nor is it to be found in the body of the fruit itself, or in the seeds, but in the *juice around the seeds.* And the substance which spontaneously subsides from this liquor, obtained without pressure, is genuine elaterium." The quantity, however, that is contained in the fruit, is extremely small, since he only procured six grains from forty cucumbers. So violent was this article, that the one-eighth part of a grain seldom failed to produce both vomiting and purging, and that often violently. The juice itself also readily inflames the skin.[*] Dr. Paris pursued the examination, and ascertained that not one grain in ten of the elaterium of commerce possesses any active properties, and that decimal part is owing to a new vegetable proximate principle, which, according to him, characterises this substance, and which he denominated *elatin*.[†]

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* Orfila, vol. 2, p. 7. London Med. Repository, vol. 10, p. 426. From an analysis of the roots of black hellebore by MM. Fenuelle and Capron, they are found to yield, 1, A volatile oil. 2. A fatty matter. 3. A resinous matter. 4. Wax. 5. A volatile acid. 6. A bitter principle. 7. Mucus. 8. Alumina. 9. Gallate of potash, and acidulous gallate of lime; and 10. A salt with an ammoniacal base. There does not appear to be any active principle in this plant. (Tilloch's Phil. Mag. vol. 60, p. 70.) It would seem that the resinous parts are supposed to be the principal seat of the lethiferous properties of this plant.—(Eclectic Repertory, vol. 9, p, 344.) It is also stated, that Vauquelin has analyzed the *helleborus hyemalis*, and found the activity of the plant to reside in a principle contained in the oil.—(Brande's Journal, vol. 13, p. 150.)

† Orfila, vol. 2, p. 11.

‡ Orfila, vol. 2, p. 13.

§ Orfila, vol. 2, p. 14.

Cucumis colocynthis. (Bitter apple.) The only part of this plant which is used in medicine, is the dried, spongy, or medullary part of the fruit. It is well known as a drastic cathartic. Stalpart relates a case, where an individual took some of it, and was shortly after seized with the most excruciating pains in the abdomen, bloody evacuations, and violent spasms.[‡] He also quotes cases from Tulpius, Schenkius, and Platerus, indicating its powerful operation, and mentions, that in one instance death followed from an enema, in which not more than a drachm of colocynth had been infused.

An individual labouring under hæmorrhoids, and affected with indigestion, took two glasses of a decoction, which subsequently proved to be that of colocynth. Frequent alvine evacuations, accompanied with cholic, were among the first effects; and, some hours afterwards, he complained of great heat in the bowels, dryness in the fauces, and unquenchable thirst. The pulse was small and extremely rapid; the tongue red; the abdomen intolerant of pressure, and there was a very violent fixed pain in the vicinity of the umbilicus. The evacuations by the bowels had now ceased. The antiphlogistic regimen was employed, but without success. Coldness of the extremities succeeded, and he gradually sunk, after a previous diminution of the abdominal pain. On dissection, the abdominal viscera exhibited marks of the most violent inflammation. The peritoneal cavity was filled with a whitish fluid, containing flocculi of the same colour. The intestines were reddened, and thickly studded with black specks. Most of them were either adherent, or covered with adventitious membrane. The mucous membrane of the stomach was detached and ulcerated, and the peritonæum in an almost putrid condition. Traces of inflammation existed also in the liver, kidneys, and bladder.

In another case, a person labouring under quartan fever and cachexy, took the same remedy, suffered severely from it, and lost his fever. Yet he continued feeble and languid, with a leaden complexion, and died, after six months, from an attack of paralysis.[§]

The symptoms produced on animals by the introduction of this substance into the stomach, are in general similar to those experienced in the human subject. Dissection exhibits an inflammation of the

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[*] London Med. Repository, vol. 12, p. 5. [†] Paris' Pharmacol. p. 270.

[‡] "Fateor," he observes, "profecto nunquam me tam horrenda in quoquam conspexisse symptomata."—Stalpart, vol. 1, p. 178.

[§] Quoted from the 2d French edition of Orfila's Toxicology, in London Med. Repository, vol. 11, p. 162.

stomach and *rectum*, while the great bulk of the intestines are in a natural state. No eschar was noticed.*

Stalagmitis cambogioides. (Gamboge.) This gum-resin, when introduced in quantity into the stomach of animals, whose œsophagus was tied, produced violent efforts to vomit, purging, dejection, and death. The mucous membrane of the stomach was inflamed, and some reddish spots were seen in the rectum. When this operation was not performed, and dogs were suffered to vomit, it did not cause any serious accident.

Daphne gnidium. (Spurge flax. Flax-leaved daphne.) The bark of this substance, like the poisons already noticed, excited vomiting, local inflammation and death, and the stomach also presents an appearance similar to what has been already described.

Daphne mezereum. (Mezereon.) Acts in a similar manner. Linnæus relates of a young lady, who died from hæmoptysis, occasioned by taking twelve berries of this plant.† Several other species are deemed poisonous. In animals poisoned by the *daphne laureola*, (spurge laurel,) Orfila observed a sanguineous effusion below the mucous coat of the stomach.‡

Ricinus communis. (Palma Christi. Castor-oil plant.) The castor-oil used in medicine is obtained by expression from the seeds of this plant. They act in a most powerful manner on the system, and produce violent vomiting and purging. Such was also the effect observed by Orfila on animals. Thirty grains produced death in a small dog, whose œsophagus was not tied. Inflammation and ulceration were noticed in the stomach. §

Euphorbia officinarum. The stalk of this plant furnishes a milky juice, which, on being dried, is called euphorbium. It is a gum-resin. Its medicinal use is solely as an errhine, and farriers employ it for blistering horses.

A female in Lincoln, (Eng.) took by mistake, eighteen days after delivery, two ounces of tincture of euphorbium, prepared with camphor, alcohol, and euphorbium. She immediately experienced a violent suffocation, burning, and pain in the throat and stomach. On the administration of warm water, copious vomiting was induced, but the pain continued for some time, nor was it relieved until after the repeated application of suitable remedies.‖

In another instance, a tea-spoonful was administered by a farrier in the dark, through mistake, for rhubarb. A burning heat in the throat and fauces was immediately felt, which soon extended to the stomach—an incessant vomiting of watery fluid took place; the tongue was covered with thick mucus; the pulse was very irregular, and at least 150 in a minute; and the patient was in a cold perspiration, and unable to speak intelligibly. An emetic was given, but it brought away only a small quantity of a thin black fluid; and mucilages and anodynes, when exhibited, were almost instantly rejected. The patient lived nearly three days, and on opening the body eight hours after death, there were found in the stomach several gangrenous spots, and its coats tore on the slightest touch. The spleen was much enlarged and rotten, while the vessels of the internal coat of the aorta were beautifully injected with blood, and showed marks of the highest degree of inflammation.[*]

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* Orfila, vol. 2, p. 17, 21. † Orfila, vol. 2, p. 27.

‡ Andral on the Morbid Anatomy of the Digestive Tube.—Journal Foreign Science, vol. 3, p. 402.

§ Orfila, vol. 2, p. 29.

‖ Case by Dr. Willis. Phil. Trans. vol. 51, p. 662.

When introduced into the stomach of animals, it produced violent pain and death, and the stomach, on dissection, contained a red, bloody fluid, mixed with powder of euphorbium. Its coats were all of a very deep red, and the colon and rectum were highly inflamed.[†]

Many other species of euphorbia are poisonous, as the *E. lathyris* the *E. cyparissias*, and the *E. tiraculli*. The second of these excoriated a man's face, on being rubbed with it; and Lamotte mentions that a clyster prepared with this plant proved fatal. In a person who allowed his closed eyelids to be rubbed with the juice of the *E. esula*, inflammation followed, and it was succeeded by the loss of the eye.[‡] Hyder Ali, in his ferocious wars against the English in India, ordered the wells to be poisoned with the *E. tiraculli*.[§]

Juniperus sabina. (Savine.) A native of Canada. Found also in the Rocky Mountains by Lewis and Clarke.

This is well known as a powerful stimulant. When administered to animals in doses of four and six drachms, it caused death, and left inflammation of the mucous membrane of the stomach, with a small ulcer near the pylorus. The rectum was somewhat inflamed. And this last was observed in every experiment.

Rhus radicans, toxicodendron, vernix. All these are natives of the United States, and the R. radicans and toxicodendron are deemed merely varieties of the same species.

The watery extract of the *radicans*, when internally administered, or applied to the cellular texture, produced a local irritation and inflammation, and after death, the mucous coat of the stomach was seen inflamed.

The juice of the *Rhus toxicodendron*, (poison oak, poison ivy,) is said by Fontana to have proved innocent to animals who were made to swallow it; but a very small portion of the milky juice applied to the human skin, excited swelling, not only in the part touched, but also over the face, eye-lids, and ears. This was the case with our author himself. A severe burning and itching continued for several days, and small vesicles, filled with a transparent sharp humour, formed in various places over his hands. Nearly the same symptoms occurred from touching the leaves.[*] I may add that similar effects are very common in this country from touching this plant. Dr. Alderson even states, that sphacelation has followed, in some cases in England, of such parts of the skin as the acrid juice had touched.[†]

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[*] Brande's Journal, vol. 3, p. 51. Case communicated by Mr. Furnival.

[†] Orfila, vol. 2, p. 43. It is stated that Orfila has found the mucous coat of the stomach in animals who had swallowed euphorbium, of a *very deep reddish brown*, and this appearance is sometimes observed in the human subject from corrosive poison.—Journal Foreign Science, vol. 3, p. 398.

[‡] Scopoli, quoted by Orfila.

[§] Quarterly Review, vol. 18, p. 47. American edit.

The *Rhus vernix*, (poison sumach,) produces similar effects. Blindness has been caused by merely handling it.[‡] And Dr. Bigelow mentions, that he has known individuals badly poisoned in winter, from the wood of the rhus vernix accidentally burnt on the fire.[§]

Anemone pulsatilla. (Wind flower.) Bulliard relates the case of an old man with rheumatic gout, who applied the root of this plant bruised, to the calf of his leg, on going to bed. Cruel sufferings succeeded for ten or twelve hours, and the whole limb became gangrenous, nor was it restored until after the application of vigorous remedies. The dried root, on being pounded, has excited irritation of the eyes, itching, and vomiting. Lastly, animals to whom the extract or the juice of the leaves had been administered, sunk under it, and exhibited the marks of violent inflammation in the stomach and rectum. The dried powder produced no inconvenience to them.[||]

The *Anemone pratensis*, *sylvestris*, and *nemorosa*, are also deemed poisons. The latter produces dysentery in sheep when they feed on it.[¶] The inhabitants of Kamtschatka make use of this plant to poison their arrows, and the wounds are most commonly fatal.[**]

Aconitum napellus. (Wolfsbane; monkshood; aconite.) Mr. Bacon, a surgeon, was called to visit a man named John Crumpler, who, at 8 P. M. had eaten some sallad, in which, by mistake, a certain quantity of aconite had been put. The patient immediately felt a burning heat in the tongue and gums, and an irritation in the cheek. This tingling sensation extended over the whole body, accompanied with twitchings. When Mr. Bacon saw him, his eyes and teeth were fixed—his hands, feet, and forehead cold, and covered with a cold sweat. No pulse could be perceived, and his breath was so short as scarcely to be distinguishable. Oil and carduus tea were immediately administered, which induced vomiting, but the symptoms still remained aggravated. Ammonia was now given, when vomiting again supervened, accompanied with purging. His symptoms now improved, although the pulse was still interrupted and irregular; and he gradually recovered.[*]

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[*] Med. Commentaries, vol. 12, p. 110. "The juice of the rhus toxicodendron produced enormous swellings on some labourers, in the Jardin des Plantes, wherever it touched them."—Sage. Edinburgh Med. and Surg. Journal, vol. 9, p. 378.

[†] Med. Commentaries, vol. 20, p. 10. Mr. Van Mons has advanced an opinion that the hurtful effects of this plant depend on a gas which it exhales, during the night or in the shade, rather than on its milky juice. He seems to have proved the irritating effects of this gas.—Orfila, vol. 2. p. 42. We have, however, too great a mass of testimony proving the nature of the juice, to allow us to consider it innoxious. Dr. B. S. Barton's account of its effects on himself, is alone sufficient. It excited itching, swelling, and vesicles, which desquamated.—New-York Med. Repository, vol. 8, p. 200.

[‡] See an account of the poison wood-tree in New England, by the Hon. Paul Dudley, F. R. S. Phil. Trans. vol. 31, p. 145.

[§] Bigelow's Medical Botany, vol. 1, p. 109. Cases are also related by Dr. Bigelow, p. 103 to 107, of the poisonous effects of the exhalations and juice of this plant.

[||] Orfila, vol. 2, p. 43-44.

[¶] London Med. and Phys. Journal, vol. 21, p. 12.

[**] Orfila, vol. 2, p. 46. Mr. Robert extracted a fluid of an acrid taste and pungent odour, from the flowers of the *anemone pratensis*, which acted like a caustic on the tongue. Vauquelin examined and confirmed his experiments, and deems the substance a peculiar one, which is probably common to the clematis and ranunculi. It should be arranged, according to him, with the concrete oily substances.—London Med. Repository, vol. 14, p. 403.

Mathiolus states that the root of this plant was administered to four highwaymen. Two of them, after having experienced the most violent pains, were saved by appropriate means; the other two died, one of whom, a few hours after the administration, became an idiot—the face was covered with a cold sweat; asphyxia, spasms, and syncope took place; he passed involuntary stools, vomited bilious and livid matter; his body swelled, and he died apoplectic. Willis relates, that a man died mad, within a very short time after eating some sallad, in which there were some of the fresh leaves of the aconitum napellus. Even its juice introduced into a small wound made into the thumb, has been known to give rise to pains in the fingers and arms, cardialgia, lipothymia, agitation, and finally gangrene and copious suppuration.[†]

Effect on animals. Mr. Brodie injected an ounce of the juice of the leaves of aconite into the rectum of a cat. He soon voided it, and then stood motionless for some minutes. At the end of nine minutes he retched and vomited, and then attempted to walk, but faltered and fell at every step, as if from giddiness. At the end of thirteen minutes he lay motionless, except some slight convulsive actions of the limbs; and in forty-seven minutes from the time of the injection, he was dead.[‡] Orfila gave the freshly-prepared watery extract to dogs, with similar effects. The posterior extremities were entirely paralyzed, and great pain seemed to be present. When, however, he used the extract purchased in the apothecary's shops, it was slow in its operation, and required large doses to produce its usual effects.[§] The root of the plant also acts as a similar, and indeed more violent, poison to animals. Wepfer destroyed a wolf with two drachms of it, and Bonetus, a young dog, with half a drachm.

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[*] Phil. Transactions, vol. 38, p. 287.

[†] Orfila, vol. 2, p. 56. Mr. Brodie states, that if a small quantity of the leaf of aconite be chewed, it occasions a remarkable sense of numbness of the lips and gums, which does not subside for two or three hours.

[‡] Brodie's Observations and Experiments on the different Modes in which Death is produced by certain Vegetable Poisons, from Phil. Trans. 1811, in Eclectic Repertory, vol. 2, p. 273.

[§] Orfila, vol. 2, p. 52. This corresponds with the following fact, mentioned in a late journal. Ten patients, threatened with phthisis, were received into the hospital at Pavia, and the extract of aconite was prescribed for them. They took this to the amount of *half a drachm at a dose*, without any inconvenience, and indeed with

When applied to the cellular texture of animals, by Brodie and Orfila, the symptoms were very similar to those previously described. On dissection, the stomach and brain were generally seen healthy, although, in a few cases, the mucous membrane of the former was slightly inflamed. In another instance, the rectum exhibited a few reddish spots.

The *Aconitum cammarum* is said to be no less deleterious than the napellus, and cases of death from its use are related by Mathiolus and Bonetus. In an instance mentioned by the former, vertigo and violent commotion of the brain preceded a general swelling of the body; the countenance became livid, and the patient died in horrible convulsions.

The *Aconitum anthora* and *Aconitum lycoctonum*, (wolfsbane,) are also deemed poisonous.*

Œnanthe crocata. (Hemlock dropwort.) Several cases are on record of the poisonous effects of this plant. A citizen of the Hague ate, with one of his friends, some of its roots. In a short time they both felt a great heat in the stomach, which was followed by alienation of mind, vertigo, cardialgia, nausea, and diarrhœa. One of them had violent convulsions, the other bled at the nose; and the one who had eaten the most, died at the end of two hours, and the other at the end of three.†

Eleven French prisoners walking about the town of Pembroke gathered and ate by mistake a small quantity of this plant, with bread and butter. One of them was shortly after seized with convulsions, and died in spite of every effort to save him. The others were attacked in a similar manner, of whom one died, and the other was relieved by forcing down an emetic. None experienced any heat at the stomach.‡

M. Charles visited a family who had eaten the roots of the œnanthe.

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improvement. All the extract, however, prepared in the hospital, being consumed, a fresh quantity was procured from the shop of an apothecary, and administered in similar doses. Mental affections of the most alarming nature rapidly supervened, accompanied with other distressing symptoms. Borda prescribed laudanum as a *contra-stimulant*, and the patients were gradually restored.—London Med. Repository, vol. 15, p. 540.

* Linnæus, however, mentions that he was informed by the wife of the principal clergyman of Lulea, that at a certain post-house in Lapland, she had seen large quantities of the *aconitum lycoctonum* collected and boiled for the use of the table, like cabbages! She was evidently acquainted with the plant.—Linnæus' Tour in Lapland, vol. 2, p. 123.

† Stalpart, vol. 1, p. 182. Our author quotes cases from Smetius, Roeslerus, and Timæus, in which the root produced vertigo and violent delirium, and, in some instances, difficult respiration and hiccup.

‡ *Howell*, in Phil. Trans. vol. 44, p. 227, with the remarks of Mr. Watson. See also cases of its poisonous effects by Dr. *Vaughan*, in Phil. Trans. vol. 20, p. 84; by Dr. *Watson*, vol. 50, p. 856, and by Dr. *Pulteney*, vol. 62, p. 469.

A sensation of burning was present in the stomach, and small rose-coloured spots appeared successively in different parts of the body. The abdomen in one case was greatly swollen. Several soldiers are also said to have died from eating them. The previous symptoms were nausea, vertigo, vomiting, and violent convulsions. Death ensued in less than an hour after using the poison. On dissection, the lungs were found distended, and their vessels full of black and dissolved blood. The bronchiæ, trachea, and mouth contained a frothy and whitish fluid. The stomach was contracted and inflamed in its extremity and lesser curvature; its coats were thickened; the intestines were puffed up, and their vessels injected. The derangements were precisely similar in all the cases; and the body of one, though preserved four days, exhibited no sign of putrefaction.[*]

Œnanthe fistulosa, has also frequently proved poisonous.

Ranunculis acris. (Butter-cups.) Its leaves are an acrid and irritating external application, producing inflammation and ulcers. Internally given, the juice of its leaves produced inflammation of the mucous membrane of the stomach.

Ranunculus sceleratus, (Water crowfoot) excited severe pains and convulsive movements in Krapf, although he took only a single flower which he had well pounded. Its leaves and juice excoriated the tongue and mouth, and produced burning pain in the œsophagus. Plenck destroyed a dog with its juice, and found the stomach red and corroded, and the pylorus tumefied. Externally applied, it produces extensive ulcers.

Ranunculus flammula, has often destroyed whole flocks of animals, from grazing on it in the spring.

Ranunculus arvensis, poisons sheep, and three ounces of its expressed juice killed a dog in four minutes.[†]

Several other species are equally poisonous, as the *bulbosus, ficaria, alpestris, aquatilis,* &c.[‡]

Colchicum autumnale. (Meadow saffron.) This plant acquired considerable celebrity some years since, from its being supposed to be the active ingredient in the *Eau medicinale* of Husson.

Its seeds have proved fatal to several children, in consequence of eating them, and cattle also suffer greatly by them, but only in the *spring,* when the seed-vessel is fully matured. The seed, if swallowed, adheres to the coat of the stomach, and produces at the several points of adhesion, spots of inflammation, which occasion the death of the beast.[§]

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[*] Duval, quoted by Orfila, vol. 2, p. 67.

[†] London Med. and Phys. Journal, vol. 21, p. 12.

[‡] The ranunculus acris, sceleratus, flammula, bulbosus, and aquatilis, are natives of the United States.

[§] Mr. Want, in the Annals of Philosophy, vol. 4, p. 281, from information communicated to him by Sir Joseph Banks and Mr. Andrew Knight. In the Edinburgh Annual Register, vol. 7, p. 114, it is mentioned that a farmer, near Tetbury, lost seven yearling beasts out of eighteen, by putting them in a pasture where this plant

The following is an instance of its poisonous effects on man. An ounce and a half of the vinous tincture of colchicum was by mistake given to a feeble man, aged fifty-six, and labouring under chronic rheumatism. No complaint was made until about an hour after, when retching and acute pains at the stomach came on, and vomiting and purging supervened. This state continued for nearly twenty-four hours, when the purging ceased, but the most distressing nausea continued, with frequent retching. The stools were, during the succeeding night, often involuntary, but not bloody. Excessive thirst came on, and continued till death, with severe pains of the stomach and bowels. In the evening, the patient seemed nearly exhausted; delirium appeared; the pulse could scarcely be perceived. He lived, however, through the second night, but died the morning following. On dissection, there was a redness of the stomach observed, but no appearance of inflammation in the bowels.*

In addition to the vegetables already noticed, I may briefly add the following:—

Chelidonium majus, (celandine), produced death in animals, both when introduced into the stomach and when applied to wounds. In the former case, the stomach was found inflamed, but not in the latter. The wounds, however, were inflamed and livid, and in both modes of application, the lungs were seen livid and distended with blood. This plant is naturalized in this country. The *chelidonium glaucium* has caused delirium and purging in a family, who eat of a pie in which it had by mistake been put.†

Delphinium staphysagria. (Stavesacre.) An ounce of this substance introduced into the stomach of a dog, whose œsophagus was tied, caused dejection, but neither vertigo or convulsions, and death succeeded in fifty hours. The mucous membrane of the stomach was inflamed, but the other organs presented no alteration. When applied to a wound in a moistened state, it induced dejection, vertigo, and finally death. The wound was inflamed, and the limb greatly swelled, but the digestive canal was sound. Its local effects are evidently the most striking.‡

Narcissus pseudo-narcissus. (Meadow narcissus, daffodil.) The extract of this plant, whether externally or internally applied, produced violent vomiting or attempts to vomit. Death shortly ensued;

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grew in abundance. On opening their bodies *the food was found clogged together, in a crude and undigested mass, incapable of passing through the proper ducts.* The French call it, among other names, *tue chien*, from its killing dogs.

* Edinburgh Med. and Surg. Journal, vol. 14, p. 262. I have already, (p. 514,) mentioned that the vegetable alkali, termed *Veratrine*, has been detected in the root of this plant.

† Phil. Transactions, vol. 20, p. 263.

‡ Lassaigne and Fenuelle have lately discovered an alkali in the seeds of this plant, which they denominate *Delphine*. It appears to exist in combination with malic acid, and when pure, is described as extremely acrid.—Edinburgh Philosophical Journal, vol. 1, p. 418 Annals of Philosophy, vol. 16, p. 32.

and in every instance the mucous membrane of the stomach was inflamed, and in several, that of the rectum.

Gratiola officinalis. (Hedge hyssop.) Death followed after a considerable interval, from the introduction of the extract of this substance into the stomach of animals, and the mucous membrane was inflamed. The same result followed from inserting it into a wound, but the stomach was sound.

Jatropha curcas. (Indian nut.) The seeds of this plant act as a violent poison, and excite vomiting, insensibility, great weakness, and death. Violent inflammation was found in the mucous membrane of the stomach and intestines. It was more active in its operation, when introduced into the stomach, than when applied to the cellular texture.

The fresh root, or the juice of the *Jatropha manihot,* has been long known as a violent poison.* It produces swelling of the body, nausea, vomitings and purgings, pain, tenesmus, loss of sight, coldness of the extremities, faintings, and death.†

Scilla maritima. (Squill). This is ranked by Orfila among the poisons. In considerable doses, it produced death, when given internally, and the œsophagus tied; or when applied externally. The digestive canal, however, was always sound.

Sedum acre. (Houseleek. Wall-pepper.) This produced death when given internally, and the mucous membrane of the stomach was seen of a fiery red colour.

Rhododendron chrysanthum. The decoction of this plant has an acrid, burning taste; it is emetic, drastic, and inflames the texture to which it is applied. The *rhododendron ferrugineum* is said to be equally poisonous. Welsch speaks of a meal which became fatal to the guests, from having eaten of a hare which had been fed upon its leaves.

Fritillaria imperialis. (Crown imperial.) It is deemed a poison by some, but in the experiments of Orfila, death did not ensue until several days, and no lesion was remarked in the digestive canal.

Pedicularis palustris, has an acrid, burning taste, and is said by Gleditsch and Gunner to have injured sheep and oxen.

Cyclamen Europæum. A violent cathartic, and it also excites vomiting. Bulliard states, that its root produces cold sweats, dizziness, and convulsive movements—the patient voids blood by vomiting and by stool; and a super-purgation supervenes, which proves fatal.

Plumbago Europæa. Sauvages observes, that the workmen who make use of the decoction of this plant, for the purpose of obtaining a yellow dye, are tormented by a severe head-ache if they work longer than six hours. Its taste is acrid and almost caustic.

Convolvulus scammonea. (Scammony.) The experiments of Orfila contradict the opinion of some toxicologists, that the juice of this plant is poisonous. He frequently administered four drachms of it to dogs, who had the œsophagus afterwards tied, and he only observed alvine evacuations. They lived six or seven days.

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* See Piso. quoted by Orfila, vol. 2, p. 78, and Phil. Trans, vol. 2, p. 634.

† Humboldt states, that there are two kinds of *juca,* which furnish the cassava or manihot. The root of the *juca dulce* is perfectly innocent, but that of the *juca amarga,* or bitter manihot, conceals a deadly poison. Heat, however, will destroy its noxious qualities.—Edinburgh Review, vol. 16, p. 245, American edit.

Cerbera ahovai. The nut of the fruit of this plant is deemed highly deleterious, as also the fruit of the *Cerbera manghas.*

Cynanchum erectum. Plenck relates, that thirty-six grains of the leaves of this plant administered to a dog, produced violent vomiting, a trembling, convulsions, and death. The *Cynanchium vimiale* furnishes a milky juice, extremely caustic.

Lobelia syphilitica. (Cardinal flower.) A native of the United States. This is an acrid plant, and acts as an emetic and purgative.

The *Lobelia longiflora* possesses still more energetic properties. In Spain, according to Orfila, it is called *Rabienta cavallos,* because it kills horses.

Lobelia inflata. (Indian tobacco. Emetic weed. Eye-bright.) A native of the United States. This is a powerful emetic, and distressing and long-continued sickness often accompanies its operation. "A melancholy instance of death, occasioned by the use of this plant, in the hands of a quack, is detailed in the sixth volume of the Massachusetts Reports, in the trial of Samuel Thompson, an empiric practising in Beverly, for the murder of Ezra Lovett. In this trial, it appeared that the patient, being confined by a cold, sent for the pretended physician, who gave him three powders of lobelia in the course of half-an-hour, each of which vomited him violently, and left him in a great perspiration during the night. The next day two or more powders were administered, each of which operated by vomiting, and occasioned great distress. In like manner, two other powders were given the subsequent day, leaving the patient in a state of great prostration. Several days after this, the physician came again, and finding his patient still worse, administered several more powders, which occasioned great distress, and at length ceased to operate. Finding that the stomach was not sensible to the emetic effect of the lobelia, the physician repeated the dose, and when the patient complained of great distress at the breast, and said he was dying, the doctor assured him the medicine would soon get down, or operate as a cathartic. However, on the same evening, the patient lost his reason, and became convulsed, so that two men were required to hold him. To relieve which, the doctor forced down two more of his powders, and the patient, as was to be expected, grew worse, and continued so until he expired.

The doctor, who had thus terminated the disease and the patient at once, was arrested and put upon trial for murder; but the homicide proving a legitimate one, from the want of a sufficient evidence of malice prepense, he was acquitted and set at liberty."*

Horses and cattle have also been killed from eating this plant.

Several species of *Apocynum,* as the *androsæmifolium, cannabinum* and *venetum*, furnish an acrid milky juice, which inflames and ulcerates the skin. The first and second of these are American plants.

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* Bigelow's American Botany, vol. 1, p. 181. Tyng's Massachusetts Reports, vol. 6, p. 134. Commonwealth *v.* Thompson.

Asclepias gigantea. Bauhin asserts, that the juice of this given in the dose of a drachm and a half, has produced violent symptoms, and a fatal hæmorrhage. When Orfila administered to dogs the *Asclepias vincetoxicum*, the animals died at the end of one or two days, and their stomachs were found inflamed.

Hydrocotile vulgaris. (Marsh pennyworth.) This plant has an acrid taste. It is a native of the United States.

Clematis vitalba. (Virgin's bower.) *Clematis flammula*, *erecta*, and *integrifolia*. These are all acrid and caustic. When applied to the skin, they produce redness, pustules, and excoriations; introduced into the stomach, they occasion an inflammation, which destroys the animal.

Pastinaca sativa. The root of this plant is said by Murray to have produced delirium, vertigo, heat at the stomach, and in the mouth and eyes, with tumefaction of the lips. It is a native of the United States.

The *Sælanthus quadragonus*, *forskalii* and *glandulosus*, are very acrid and are deemed poisonous.

Calla palustris. (Water arum.) A native of the United States. The root of this plant has a burning taste.

Phytolacca decandra. (Poke. Pigeon berries.) A native of the United States. Its juice is acrid, and acts as a violent emetic and purgative. Prostration of strength and convulsions have also been induced by it. On a dog, to whom two ounces of the liquor distilled from the berries were given, Dr. Schultz, of Pennsylvania, found it to produce nausea and drowsiness, with slight spasmodic motions, but no vomiting. This last is, however, a common effect.[†]

Croton tiglium. The seeds of this plant have an acrid, nauseous and burning taste. They were formerly employed as hydragogue purgatives, but on account of the violence of their operation, were completely laid aside. One seed is sufficient for a dose, and even this sometimes excites violent purging and vomiting.[‡]

Within a few years past the expressed oil of this plant has come into considerable use as an article of materia medica. From one to three drops is a dose,[§] and tremors and delirium have been known to occur in a male patient from a dose of two drops.[‖]

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[*] Orfila, vol. 2, p. 83. I must remark, that I cannot find any plant of this name either in Linnæus or Persoon.

[†] Bigelow's Amer. Med. Botany, vol. 1, p. 48.

[‡] See Edin. Med. and Surg. Journal, vol. 12, p. 256. Further proofs of its violent action are mentioned in a paper by Mr. Frost, (from the London Med. Repository,) in the Amer. Med. Recorder, vol 5, p. 615.

[§] According to Dr. Nimmo, of Glasgow, the kernels of the seeds of the Croton are composed of 27 parts of acrid purgative principle, 33 of fixed oil, and 40 of farinaceous matter in the hundred. The oil itself consists of 45 acrid principle, and 55 fixed oil.—Brande's Journal, vol. 13, p. 62. See also Quart. Jour. Foreign Med. and Surg. vol. 4, p. 288.

[‖] Dr. Francis. MS. Communication.

Arum maculatum, (Wake Robin) *A. dracunculus, dracontium, seguinum, triphyllum*, and other species. The third and fifth are natives of the United States.

These are all acrid, and have produced dangerous effects. When the fresh root of the A. maculatum was given by Orfila to dogs, they died at the end of from twenty-four to thirty-six hours, without any other symptom than dejection, and the digestive canal was found somewhat inflamed. Bulliard relates the following case: "Three children ate of the leaves of this plant. They were seized with horrible convulsions, and with two of them all assistance was unavailing, as they could not be made to swallow any thing. They died, one at the expiration of twelve days, and another at the expiration of sixteen. The third was saved with difficulty. Its tongue was greatly swelled, and hence deglutition was painful and difficult."*

To these, I will take the liberty of adding, *Equisetum hyemale*. (Scour grass.) A native of the United States.

This is said to be fatal to horses who eat it, and, on examination, the stomachs are found cut and lacerated by the plant.†

Tanacetum vulgare. A naturalized plant. *Oil of tansy*. Dr. Francis mentions that a pregnant female lost her life in 1816, at New-York, from taking half-an-ounce of it. Great pain and anxiety about the epigastrium were experienced until her death, which happened within a few hours.‡

Symplocarpus fœtida. (Salisbury.) *Ictodes fœtidus* (Bigelow.) (Skunk cabbage.) A native of the United States.

This plant emits a very pungent odour from the spathe and flower. Dr Barton was seized with inflammation of the eyes, in consequence of the necessary examination which he gave to it.§ A dose of thirty grains of the root has caused vomiting, head-ache, vertigo, and temporary blindness.||

As to the *treatment* of persons who have taken poisons of this class, I can only offer general directions. Vomiting and the evacuation of the deleterious substance are to be encouraged by mucilaginous drinks, If inflammation be dreaded, the antiphlogistic regimen is proper. Coffee is recommended by Orfila, in cases where considerable stupefaction ensues.

I shall conclude the examination of this class of vegetable poisons, with the notice of a substance, derived from vegetables, and from vegetable products; viz. the

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* Orfila, vol. 2, p. 83.

† Barton's Med. and Phys. Journal, vol. 1, part 1, p. 149. Our author remarks, that its fatality is attributed by some to the cylinders of ice contained in its stem. Sir George Mackenzie, in his Travels in Iceland, p. 420, states, on the authority of Dr. Hooker, that this plant is used as excellent food for horses in that island.

‡ New-York Med. and Phys. Journal, vol. 2, p. 27.

§ Dr. W. P. Barton's Medical Botany, *article* SYMPLOCARPUS.

|| Bigelow's Medical Botany, vol. 2, p. 48.

OXALIC ACID.

Numerous deaths have occurred in England within a few years, from the administration of this substance. It was generally taken in an accidental manner, having been mistaken for the sulphate of magnesia, a salt which it resembles in external character. The facility of the occurrence of these accidents is increased, from the circumstance that it is frequently applied to several domestic purposes, such as the cleaning of leather, and the removal of iron-mould and ink-spots.

The cases substantiating the deleterious effects of oxalic acid, are contained in the leading periodical publications of the day, and from a comparison of these, I am enabled to present the following account of its effects.*

When the solution is strong, (and this is usually the case, from its being mistaken for Epsom salts,) its corrosive nature is such as to excoriate the mouth in a violent manner. A young man purchased some for the purpose of committing suicide, but its extreme pungency made him hesitate in swallowing it, while it was yet in his mouth. His life was thus preserved, but a most dreadful excoriation of the tongue, mouth, and gums, was the consequence.† So also in Mr. Fraser's case, the tongue was greatly swollen, and had the appearance of being scalded. I do not, however, find any notice of this in the other cases, probably because the solution was diluted, or (which is more likely) taken down at a single swallow.

Death ensued with great rapidity—in forty minutes in one case, and in fifteen minutes in two others. A few hours is generally the term. The patient under the care of Mr. Fraser, however, survived several days, and finally died of the secondary effects. As this case is peculiar, I shall notice it at length hereafter.

Violent and most acute pain, excessive vomiting of a dark-coloured or sanguineolent fluid, catharsis, a pulse imperceptible at the wrist, and a sunken countenance, indicating the nearness of death, seem to be the symptoms observed.

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* I may premise, that after I had prepared the article on this poison, and within a few days before it was required by the printer, I received the Edinburgh Med. and Surg. Journal for April, 1823, which contains an elaborate and valuable paper on *poisoning by oxalic acid*, by Professor Christison and Dr. Coindet. These gentlemen have investigated its effects on animals, and its chemical habitudes, with great ability, and I have been much indebted on these points to their examinations.

With these preliminary remarks, I observe, that the following cases have been noticed in preparing the accompanying article :—1. Case by Mr. Royston. London Med. Repository, vol. 1, p. 382. 2. Do. by *Mr. Roberts*. Ibid. vol. 3, p. 380. 3. Do. by *Mr. George Johnson*. Ibid. vol. 6, p. 474. 4. Do. by *Mr. Williams*. Ibid. vol. 11, p. 20. 5. Do. by *Dr. Smith*, vol. 12, p. 18, 6-7. *Two cases* in Edinburgh Med. and Surg. Journal, vol. 13, p. 249. 8. Case by *Mr. W. W. Fraser*, Edinburgh Med. and Surg. Journal, vol. 14, p. 607. 9. Case of *Michael Dillon*, in Cooper's Tracts on Medical Jurisprudence, p. 449, from a London paper.

To these, Drs. Christison and Coindet add cases from the Dublin Hospital Reports, from Dr. Percy's Inaugural Dissertation, and from the London Courier. Probably the last is the case quoted by Dr. Cooper. If so, we have eleven cases on record, nine of whom proved fatal, and only two recovered; and these nine cases (all accidental) occurred within two years and a half, in England.—Brande's Journal, vol. 3, p. 49.

† London Med. Repository, vol. 7, p. 526.

Appearances on dissection. These indicate the presence of a powerful acid. In Mr. Royston's case, where the subject was a female, who died in forty minutes, the villous coat of the stomach was injected with blood, and florid over its whole surface. Patches of an extraordinary intensity were also noticed. In other cases the coat was entirely corroded, and indeed the stomach perforated, so that its contents had escaped into the cavity of the abdomen. The œsophagus of one individual was so injured, that its cuticular coat peeled off with the slightest effort.*

The intestines sometimes partook in the inflammation and contraction, and at other times not. But the viscera of the thorax and the brain do not appear to have been diseased in those cases where their examination is noticed.

In the case related by Mr. Fraser, an individual took half an ounce of oxalic acid in solution, instead of salts. He instantly became conscious of the mistake, from perceiving the acid taste. Pain and vomiting ensued, and although they were mitigated in some degree by alkaline remedies, yet they recurred with violence. Spasms, impeded respiration, and general numbness were complained of; the pulse was scarcely perceptible at the wrists or temples; the extremities were cold, and the matter vomited became tinged with blood. After a short time, he brought up a large quantity of blood. Diluents were freely administered, together with anodynes, and his situation gradually became more tolerable. Numbness, however, occasionally occurred, and was relieved by warm applications, and a drink of sago and wine. On the second day, vomiting, retching, spasms, and singultus supervened; the pulse was nearly 100, and feeble, and numbness and chillness of the feet were present. A repetition of previous remedies gradually moderated these, but the hiccup continued for several days. On the sixth day, he felt himself so well as, contrary to directions, to ride out in a gig. After this, debility came on gradually; an eruption appeared over the whole body, and hiccup was occasionally present. He retained his senses until the day before his death, and complained often on swallowing any article which was not perfectly bland. He expired fourteen days after taking the poison, in a state of perfect exhaustion.

On dissection, the stomach and a small portion of the intestines presented the marks of inflammation: the villous coat was completely destroyed, and this abrasion extended upwards throughout the whole of the œsophagus, exposing the muscular coat. In some parts the villous coat seemed entire, but, on examination, it was found to be soft, and easily rubbed off with the finger or sponge. The muscular coat of the stomach and œsophagus was much thickened, highly injected, and exhibited a dark gangrenous appearance. No perforation of the stomach was observable.

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* "A quantity of a dark-coloured fluid, resembling coffee-grounds, and probably consisting of extravasated blood altered by the poison, was generally found in the stomach."—Christison and Coindet.

The small intestines exhibited similar appearances, but partially and in a lighter degree. The other viscera were healthy.

Effect on animals. On this point, we have the experiments of Mr. A. T. Thomson, and those of Drs. Christison and Coindet. The former gentleman produced death in a very few minutes, by introducing from ten grains to half a drachm into the stomachs of rabbits and dogs. Convulsive movements generally preceded the fatal termination, and, on dissection, the stomach was found very rotten, diaphonous and pulpy to the touch, and its blood-vessels enlarged and very black. The mucus contained in it was coagulated. The lungs were inflamed, and the blood found in the lungs, heart, abdomen, and the frothy fluid found in the bronchial cells, shewed traces of an acid. The œsophagus and pharynx were healthy.*

In the experiments of Christison and Coindet, the œsophagus was tied in every instance, and the violence of the efforts to vomit was directly in proportion to the quantity of the poison. Death, however, always succeeded after a short interval. On dissection the stomach was found filled with the dark-coloured fluid already noticed, when speaking of the examinations of the human subject, and which is evidently extravasated blood acted on by the acid. The internal membrane of the stomach was always of a deep cherry-red colour, and generally streaked with lines of black granular extravasation. The degree of corrosion induced appears to depend on the strength of the acid.

When portions of a dead stomach were submitted to the action of a saturated solution, the mucous epidermis separated, and appeared thickened and brittle. After some hours the villous coat was also acted upon, and in two days it was brittle and easily scraped off, and the other tunics were softened, swollen, and translucent. It thus evidently exerts a powerful chemical action on the organs concerned.

These observers also noticed, that a small quantity of acid, when diluted, destroys an animal much sooner than when concentrated, and, on dissection, no unnatural appearance whatever could be detected in the stomach, excepting a slight cineritious tint of the mucous epidermis.

The result drawn from their numerous experiments is, that oxalic acid in most circumstances acts through the medium of absorption. They could not however detect its presence in any of the fluids.†

Tests. (*a*) Taste the suspected substance—if it be oxalic acid, it is very sour; if epsom salts, very bitter and saline.

(*b*) Litmus and blue sugar-loaf paper are reddened by the acid, but not affected by the salts.

(*c*) Take a little writing ink and drop it on one or two of the suspected crystals. If they be epsom salts no alteration will occur, but if oxalic acid be present, the ink will become of a reddish brown, and no longer appears as ink, since the acid dissolves the black oxide, and forms oxalate of iron.* These tests are principally valuable as precautionary ones. Drs. Christison and Coindet recommend the three following to be used on all suspected fluids found either in the stomach, or vomited.

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* London Med. Repository, vol. 3. p. 383.

† Edinburgh Med. and Surg. Journal, vol. 19, p. 163 to 186.

(*d*) Decolorize the fluid, if necessary, with chlorine. The hydrochlorate of lime, if the solution contains oxalic acid or oxalate of lime, will throw down an insoluble oxalate of lime. But it also precipitates with the carbonates, sulphates, phosphates, &c. This then is to be distinguished by the following experiments: The nitric acid will not take up the sulphate of lime, but a few drops of it dissolved the oxalate. The hydrochloric (muriatic) acid will not dissolve the oxalate, unless in very large quantity, while two or three drops will take up the carbonate, phosphate, tartrate, or citrate.

(*e*) Decolorize as before, and add sulphate of copper. It precipitates oxalic acid bluish-white, and the oxalates pale-blue. The only objection to this is, that it precipitates the carbonates, and throws down the phosphoric acid, whether free or combined. The muriatic acid must be here again used as above.

(*f*) Nitrate of silver gives a heavy white precipitate with oxalic acid, and still better with the oxalates; and this precipitate, when dried and heated over a candle, becomes brown on the edge; then, of a sudden, fulminates faintly, and is all dispersed in white fumes. This is deemed a very delicate test, as, from a quarter of a grain dissolved in 4000 parts of water, the experiments procured enough of the powder to show its fulmination twice.

These tests are very little influenced by the presence of such animal matter as may exist in the suspected fluid, after boiling and filtration. The chief animal principle then present is gelatine, and neither the hydrochlorate of lime, sulphate of copper, or nitrate of silver, precipitate it alone. They therefore, and especially the two first, will not be affected by its presence; but when it is present in very large proportion, it suspends the action of nitrate of silver.

If magnesia or chalk has been used as an antidote, boil the powder in pure water, and then subject the filtered liquor to the three tests already described.†

Antidotes. Death is generally so sudden in these cases, that but little can be done.

Mr. Thomson recommends a mixture of chalk and water to be given as soon as possible. Oxalate of lime will thus be formed in the stomach.‡ Magnesia may also be advisable. The alkalies should not be given, as Christison and Coindet found death to follow in animals from the exhibition of the oxalates of potash and ammonia, in a few minutes.

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* Quarterly Journal Foreign Med. and Surg. vol. 5, p. 152.

† Edin. Med. and Surg. Jour. vol. 19, p. 198-199.

‡ London Med. Rep. vol. 3, p 388. A case, in which this evidently proved serviceable, is related in the same work, vol. 12, p. 18.

Should the patient be so fortunate as to recover from the immediate effects, it will be advisable to employ stimulants, as brandy, friction, and hot fomentations.

It has been supposed that *tartaric* and *citric acids*, in large quantities, would actin a similar manner on the human system.

2. NARCOTIC POISONS.

Narcotic poisons are defined by Orfila to be those which produce stupor, drowsiness, paralysis, or apoplexy and convulsions.

OPIUM.

This substance is the inspissated juice of the *Papaver somniferum*, or common white poppy, obtained by incision into the capsules, when they have arrived at a certain state of maturity. Its appearance and character are well known, and I shall hence not enlarge upon them at this time. It has also been ascertained, within a few years, that it is a very compound substance, consisting, according to the latest examinations of chemists, of the following constituents: resin, gum, bitter extractive, sulphate of lime, gluten, and three new bodies, *narcotine*, *morphia*, and *meconic acid*. Of these I shall give some account in the note, but in my present remarks shall confine myself principally to a consideration of the poison in its compound state.*

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* Derosne appears to have been the first of modern chemists who analyzed opium with success. He found in it, in 1803, a crystallizable substance, which was styled, after him, the *salt of Derosne*. In 1817, the discoveries of Sertuerner, of Eimbeck, in Hanover, were published. He announced a new alkaline body, *morphia*, and a new vegetable acid, the *meconic*. Morphia was obtained by him, by digesting opium with distilled water for a considerable time, and then adding ammonia in excess. A precipitate was caused, which formed into crystals, and these crystals were impure morphia. As to its action on the human system, it may be remarked, that when uncombined it had little effect, on account of its insolubility; but when dissolved in alcohol, half a grain produced a general redness over the body. Three half grains, taken within an hour, caused a sense of weakness, faintness, and a general stiffness. Meconic acid is also obtained from the liquor precipitated by the ammonia. This he found did not produce any sensible effects, as he took five grains without any inconvenience.

Robiquet shortly after published a new process for obtaining morphia, viz. boiling the opium with magnesia. This leaves a precipitate, which is boiled with alcohol, and the latter menstruum dissolves the morphia. Orfila and Magendie now examined this substance and its compounds. Twelve grains of morphia, introduced into the stomach of dogs, produced no sensible effect, while the same quantity of the watery extract of opium caused violent symptoms of poisoning, and sometimes even death. This inertness is owing to its insolubility, but when dissolved in vinegar, or in oil of olives, it acts as a powerful and ready poison.

A new experimentar afterwards presented the result of his investigations, viz. M. Robiquet. As the investigations of Magendie had shown that the salt of Derosne (or *narcotine*, as Robiquet styled it) produced a stupor differing from real sleep, and acted as a poison on dogs, in small doses, he conceived that he might render opium a more soothing medicine, by depriving it of this irritating principle. And accordingly, after macerating the opium in water, he evaporated it to a thick syrup, and

Symptoms. When opium or laudanum is taken in large quantities, the following symptoms are usually observed within a short time: insensibility and immobility, respiration, scarcely perceptible, and a small and feeble pulse, which sometimes becomes full and slow. As the effects increase, the lethargic state becomes more profound, deglutition is suspended, the breathing is occasionally sterterous, the pupils are insensible to the application of light, the countenance is pale and cadaverous, and the muscles of the limbs and trunk are in a state of relaxation. Vomiting sometimes supervenes, and there is an occasional glimpse of returning animation; but the comatose state soon returns, and death, which is often preceded by convulsions, rapidly follows.

The bladder is sometimes unable to contract on its contents, and attempts to empty it prove useless.* While again, in cases of recovery, such a weakness will be left in the lower extremities, and approaching so near to paralysis, that it cannot retain its contents.†

Two instances are mentioned in which vomiting was the *sole effect*, induced from taking large quantities of opium. In one case, an ounce of laudanum was swallowed at midnight; the individual went to sleep, and shortly after rising began to vomit, and continued doing so during the day. The next day he was well. In the other, three ounces produced, after a few hours, a similar result.‡

On its effects, when taken as a substitute for spirituous liquors, it is not necessary for me to dilate. The Turks, as is well known, are of all nations the most generally attached to its use, and the following description of the *Teriakis*, or opium-eaters, of Constantinople, fully explains the consequences. "Pale, emaciated, and ricketty, sunk into a profound stupor, or agitated by the grimaces of delirium, their

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then treated it with ether. This etherous tincture is submitted to distillation as long as crystals of narcotine are obtained. When the ether has no longer any action on the extract, he evaporates the solution, and the opium is prepared.

As these experiments were in opposition to the conclusions of Orfila, the latter undertook several new experiments, in order to settle the question, and he has satisfied himself of the following results:—1. That opium owes its venomous qualities to the morphia, as well as to the salt of Derosne which it contains. 2. That these two compounds act very differently on the human economy. 3. That the known action of opium is the result of the combination of these two compounds. 4. That the toxic quality of opium must be attributed principally to the morphia, since the extract, deprived of the salt of Derosne, kills the animals in the same space of time as the common extract.

For further information on this interesting subject, I must refer to the following works, from which the above abstract is collected:—London Med. Repository, vol. 8, p. 438; vol. 9, p. 332. Edinburgh Med. and Surg. Journal, vol. 18, p. 151. Brande's Journal, vol. 12, p. 311. Chapman's Journal, vol. 3, p. 187; vol. 5, p. 45. Annals, vol. 12, p. 55; vol. 13, p. 158. Quart. Jour. For. Med. and Surg. vol. 3, p. 250 to 254.

* See case by Mr. Cornish, London Med. and Phys. Journal, vol. 31, p. 193; and also a case, Ibid. vol. 28, p. 80.

† An instance of this kind, by Mr. Murley, is quoted in the Eclectic Repertory, from the London Med. Review for October, 1811.

‡ London Med. Rep. vol. 9, p. 525; vol. 10, p. 175.

persons are, after the first view, easily to be recognized, and make an impression too deep to be speedily erased. The increasing attachments for wine has diminished the consumption of opium, but there are still Teriakis who will swallow, in a glass of water, three or four lozenges, amounting to one hundred grains."*

There is, however, one point connected with this subject, which deserves serious notice. I allude to the practice so much in vogue, of administering paregoric, laudanum, Godfrey's cordial, and other preparations of opium, to infants of a tender age. The consequences are, costiveness—a pallid countenance—tremulous, and often convulsive motions—emaciation—stupor or fretfulness. The stomach becomes disordered, vomiting occasionally supervenes; the stools are dark-coloured and fœtid, and a perfect state of atrophy is present before death closes the scene. These are the effects of a continuance of this most pernicious treatment, and it is to be feared that it prevails very extensively. Dr. Clarke, at Nottingham, in England, stated some years since, that in that town alone, upwards of two hundred pounds of opium, and above six hundred pints of Godfrey's cordial, were annually retailed to the poorer class.†

Appearances on dissection. Although the cases are numerous of death by this poison, yet the examinations of the body have been few and imperfect. If taken in large quantity, some portion of it will generally be found in the stomach or intestines.‡ But the condition of these organs is usually not much varied from the healthy state.

In a case already mentioned, the body was covered with red-brown patches on the arms, shoulders, and nucha, the day after death; the face was pale, and the mouth filled with froth. There was a general congestion of black blood in the brain; the dura mater was injected, and even the capillaries gave out, on incision, minute drops of black blood. The heart was filled with the same, as were the lungs, and the bronchiæ were reddish. The stomach was swollen, and had red-brown patches at its fundus. The intestinal mucous membrane was minutely injected—being the effect of congestion, and not of inflammation. The liver and spleen were gorged with blood, and the bladder and kidnies sound.§

In Mr. Stanley's case, related in the Transactions of the London College of Physicians, water was found in the cellular tissue of the pia matter, covering the greater part of the cerebrum; but in other respects the brain had no unusual appearance. The stomach was contracted and filled with a fluid, not resembling laudanum either in colour or smell. There was no inflammation present.*

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* Hobhouse's Albania, vol. 2, p. 944, London edition. See also Philosophical Transactions, vol. 19, p. 288.

† Edinburgh Med. and Surg. Journal, vol. 4, p. 271; and vol. 12, p. 423.

‡ I say *generally*; but there are several cases mentioned, where none could be discovered after death, as in the case of a soldier, who took two drachms of opium, and died in six hours and a half.—London Med. Repository, vol. 14, p. 426. See also Edinburgh Med. and Surg. Journal, vol. 19, p. 196, case related by Dr. Christison; and London Med. and Phys. Journ. vol. 31, p. 198, case by Mr. Cornish.

§ London Med. Repository, vol. 14, p. 426. In a case quoted by Orfila. from Lassus, the stomach is also said to have been inflamed. These, however, I believe, are rare cases.

In Mr. Cornish's case coagulable lymph was effused between the dura mater, the arachnoid coat, and the pia mater, and there was rather more fluid than is usual in the lateral ventricles. The stomach was natural, and the bladder contained about a pint of urine.†

Effect on animals. Crude opium, or its watery extract, when introduced into the stomach of dogs, caused, within a few hours, a weakness and paralysis of the posterior extremities, and convulsions of the muscles of the trunk and face. The pupils of the eye were not, however, more dilated than natural, and there was no moaning, but an extreme dejection. The paralysis and convulsions increased until death supervened. Similar effects were produced when the œsophagus was tied, except that death ensued earlier from large doses.

When the watery extract was inserted into the cellular tissue of the thigh of a dog, paralysis of the posterior extremities, convulsions and accelerated circulation, with trembling of the head and twitches of the lower jaw occurred, and death followed in a much shorter time than in the previous series of experiments. The injection of the extract into the anus, produced the earlier symptoms of the poison, but the animals recovered.

Dissections generally presented the digestive canal in a sound state. The lungs however were usually livid and distended with blood, and the blood in the ventricles was often black and coagulated.‡

Treatment. On this point, I must necessarily be brief, but a few remarks on it can hardly ever be misplaced in a work of this nature.

The experiments of Orfila have demonstrated, that the administration of vinegar or other vegetable acids, previous to the evacuation of the poison by vomiting, *will accelerate and aggravate the action of the opium;* but that when the opium has previously been expelled, water acidulated with vinegar, or any other vegetable acid, will tend to diminish and correct the effects. Coffee, when prepared in the form of strong decoction or infusion, rapidly lessens the symptoms, but cannot be considered as an antidote. The results of his experiments led him to give the following directions for the treatment of a person poisoned by opium. Induce vomiting, if possible, with sulphate of copper, tartar emetic, or sulphate of zinc. And the administration of watery liquors, with the view of promoting the vomiting, should be forbidden, as they dissolve the opium and promote its absorption. Bleed the patient immediately after the rejection of the poison, and repeat this if necessary. Afterwards, administer alternately water acidulated with any vegetable acid, and a strong infusion of coffee warmed. And in ten or twelve hours exhibit an enema, and let the arms and legs of the patient be well rubbed Purgative clysters should be continued, if it be suspected that any of the opium still remains in the large intestines.*

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* Vol. 6, p. 414.

† London Med. and Phys. Journal, vol. 31, p. 193. The same state of the bladder was seen in another case. Ibid. vol. 28, p. 80.

‡ Orfila, vol. 2, p. 110 to 116. The experiments of Fontana, made some forty years since, led him to the result, that the watery solution would kill animals by injecting it into the cellular tissue, or into the anus; but when the opium was dissolved in alkohol, its effects were much quicker and more violent. He hence drew the conclusion, that this difference was the effect of the alkohol; but such an opinion is evidently untenable, while the diversity of results is readily explained by the late discoveries concerning opium.—See an account of Fontana's experiments in the Med. Commentaries, vol. 12, p. 113.

These directions comprise, I apprehend, the most valuable part of the practice now adopted in cases of poisoning by opium, and numerous instances are on record, which either directly or indirectly strengthen them. Another circumstance, which increases their value, is the fact that they are principally deduced from experiments on animals.†

The affusion of cold water on the head and over the body,‡ must also doubtless prove a valuable assistant.§

Hyoscyamus niger.|| (Black henbane.) Naturalized in the northern states and in Canada. Several cases are on record of the baneful effects of this plant. Wepfer mentions that several monks made a repast on the roots of wild endive, among which were mixed by mistake two roots of henbane. In a few hours, some experienced vertigo;

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* Orfila, vol. 2, p. 172 to 193.

† A reference to a few cases may be useful to the examiner; and of these, that related by Dr. Marcet, (Medico-Chirurg. Transactions, vol. 1, p. 77,) is one of the most instructive. The patient had swallowed *six ounces* of laudanum. Six hours after, when dissolution was apparently near, the sulphate of copper was given, and induced vomiting. He was kept incessantly on his legs, and internal stimulants were freely administered. Blisters and sinapisms were also applied to the feet. By persisting in this course, and aiding it by other judicious treatment, for which I refer to the case, the patient recovered.—See also cases of recovery in Edinburgh Med. and Surg. Journal, vol. 7, p. 805, by *Mr. M'Kechnie.* Ibid. vol. 14, p. 608, by *Dr. Kinnis.* Ibid. vol. 17, p. 226, by *Mr. Richardson.* Venesection was used in this instance with great success. Ibid. vol. 18, p. 49, two cases by *Dr. Howison.* Ibid. vol. 18, p. 343, by *Dr. Kennedy.* Ibid. vol. 19, p. 247, by *Mr Ross.* Here also venesection, after the administration of emetics, proved successful in removing the comatose symptoms. New-York Med. Repository, vol. 5, p. 124, by *Dr. Rush,* recommending venesection, and stating four cases in which it was successfully used. This was in 1801. Ibid. vol. 16, p. 10, by *Dr. Akerly.* A curious fact is mentioned by Dr. A. A lunatic stole two ounces of laudanum, which was super-saturated with carbonate of potash, and swallowed it. It produced no bad effects.—I may add in this place, that I have known most happy results from a repetition of strong enemas of assafœtida, particularly during the latter comatose stage.

‡ Successful cases, in which this was a leading remedy, are related by Mr. Wray and Dr. Copland, in the London Med. Repository.—See Journal Foreign Science, vol. 3, p. 62 and 65.

§ The mode proposed by Mr. Jukes, (of extracting the poison by a syringe introduced into the stomach,) also deserves attention in extreme cases. He used it successfully on himself.—See New-England Journal, vol. 12, p. 181.

|| Meissner and Brandes have discovered an alkaline body in this plant, which they term *hyoscyama,* and in which they conceive the poisonous properties to be concentrated. The vapour of it is very injurious to the eyes, and the most minute fragments placed on the tongue prove very deleterious.—Tilloch, vol. 57, p. 308. Brande's Journal, vol. 11, p. 205.

others a burning of the tongue, lips, and throat. Severe pains were also felt in the iliac region, and in all the joints. The intellectual faculties and organs of vision were perverted, and they gave themselves up to actions that were mad and ridiculous. They, however, recovered. In other cases, a haggard countenance, dilatation of the pupils, difficult breathings, small and intermittent pulse, loss of speech, trismus, and temporary loss of intellect, have been the principal symptoms, while the extremities have been observed cold and nearly paralyzed. A clyster, prepared of a decoction of henbane, caused a numbness and loss of motion of the upper and lower extremities, propensity to sleep, and difficulty of hearing.*

Dr. Patouillat, of Toucy in France, saw nine persons poisoned with this root. Some were speechless and convulsed; others occasionally howled. In all, there was a protrusion of the eyes, contortion of the mouth, and delirium. Emetics relieved them, but their sight was for some days affected, and all objects appeared red like scarlet.†

The vapours of this plant and of belladonna are said to have been lately used by Hufeland in nervous affections. When exposed to this, even although precautions were taken to prevent the fumes from reaching the face, profuse perspiration ensued, with a sense of fulness in the head, and sometimes tremors, difficult respiration, and vertigo.‡

On animals, the juice and decoction of the root produced lethargic effects, but very seldom any giddiness or convulsions. When applied to the cellular texture, death ensued sooner, and vomiting occurred in one case, but generally the comatose symptoms were all that were observed. No inflammation was noticed in the stomach; the lungs were occasionally livid, and black blood was observed in the heart.

Hyoscyamus albus. (White henbane.) The following case is an example of its effects. In April, 1792, a large quantity was carried by mistake on board the French corvette *La Sardine,* which the sailors had gathered in one of the isles of Sapienzi in the Morea, where the vessel then was. A part of it was put into the ship's copper, and the remainder into those of some of the subaltern officers. At four o'clock they all dined. In a short time, vertigo, vomiting, convulsions, gripes and purging, were generally experienced; and when Dr. Picard, the surgeon, came on board, he observed the gunner making a thousand grimaces and contortions. By keeping up the evacuations, most of them recovered; but those in whom there were none, remained for some time in a sickly condition.§

The *Hyoscyamus aureus, physaloides,* and *scopolia,* are also deemed poisonous.

PRUSSIC ACID. (*Hydrocyanic Acid.*)

This substance, in its concentrated state, is one of the most energetic of poisons, and its virulence varies with its strength.

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* Orfila, vol. 2, p. 135 to 189. Foderè, vol. 4, p. 25.

† Phil. Transactions, vol. 40, p. 446. See also additional cases by *Dr. Stedman,* in Ibid. vol. 47, p. 194; by *Sir Hans Sloane,* Ibid. vol. 38, p. 99.

‡ Monthly Journal of Medicine, vol. 1, p. 296. § Foderè, vol. 1, p. 23.

The following case is related on the authority of Hufeland, as an example of its effects. A man about to be taken up as a thief, swallowed an ounce at 2 P. M. He staggered a few steps, and fell. The pulse could not be felt, and there was no trace of breathing. In a few minutes, a single and violent expiration took place. The extremities were cold; the eyes half open and shining, but without any irritability. At night he was stiff. The blood on dissection had the smell of bitter almonds. The pia mater and vessels of the brain were filled with blood. The stomach was highly inflamed, and presented gangrenous spots of the size of a sixpence. The villous coat separated on the slightest pressure of the nails. The intestines were healthy—the liver natural, but filled with black blood. All the blood was collected in the veins, while the arteries were empty, and it was generally of a black-blue colour, fluid, yet thick like oil, and had a most penetrating smell of bitter almonds.[*]

Orfila also relates the following, as communicated to him by M. Fueter. "M. B. professor of chemistry, left, from forgetfulness, a flask, containing alcohol saturated with prussic acid. The servant-girl, seduced by the agreeable smell of the liquor, swallowed a small glass of it. At the expiration of two minutes, she fell dead, as if she had been struck with apoplexy. The body was not opened."[†]

The inspiration of this substance, when diffused in the state of gas through his laboratory, caused in Dr. Ittner, oppression and painful respiration, giddiness, vertigo, and burning heat[‡]

It is not necessary at this time to enlarge on its use in medicine, but I will only observe that no caution can be too great in administering this highly-powerful agent.[§]

Effects on animals. Two drops of the acid prepared according to the process of Scheele, and which consequently contained considerable water, caused a bitch to stagger, fall, and vomit. Eight drops induced weakness, plaintive cries, purging, falling down, tetanic stiffness, dilatation of the pupils, paralysis, insensibility, and at length sleep. "In fifteen minutes the animal rose up, passed some urine, experienced an opisthotonos, and in half an hour was recovered." Thirty or forty drops destroy dogs and cats in six, twelve, or fifteen minutes after taking them, and the blood is all found in the veins, the arteries being empty, while the muscles are pale. Convulsions generally attend the administration of this poison.

Animals of various classes equally sink under its effects—a carp who was made to swallow twenty-four drops—snails, helices, leeches, crabs, lobsters, bees, ants, and grasshoppers. A cow, according to

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[*] London Med. Repository, vol. 4, p. 506.

[†] Orfila, vol. 2, p. 147.

[‡] American Med. Rec. vol. 2, p. 530. See also the effects produced on Prof. Silliman, from breaking a bottle in his laboratory.—Silliman's Jour. vol. 2, p. 93.

[§] The following articles deserve perusal on this point—on *the Deleterious Effects of the Hydrocyanic Acid*, by Dr. Randolph, of Philadelphia.—Amer. Med. Rec. vol. 4, p. 456. Review of Granville's Treatise on Prussic Acid. Ibid. vol. 4, p. 562.

Emmert, died with all the phænomena of opisthotonos, a few seconds after injecting half a drachm into the trachea.*

M. Robert exposed animals to the aperture of a matrass, in which prussic acid had been distilled, and the air of which consequently was a mixture of the atmospheric fluid with the vapour of this acid. Birds, rabbits, cats, and dogs, all died in a short space of time—from an instant to six minutes. The liquid acid in its pure state, and also dissolved in alcohol, was equally, but not so promptly destructive. He examined a dog destroyed by it. The brain was healthy, but exhaled the odour of prussic acid. The tongue was soft, bluish, and hung out of the mouth. The mucous membrane of the trachea was injected. The lungs were of a bright-red hue, and the heart was filled with very dirty deep-red blood. The veins contained thick and dark-coloured blood. The lungs and heart, and their contents, exhaled the odour of prussic acid.†

These details are sufficient to illustrate the effects of this poison, and I will content myself with referring the examiner to some other sources of information on this point.‡

Tests. Dr. Granville, in his treatise on the prussic acid, recommends the following: collect the blood contained in the ventricles of the heart, a portion of the contents of the stomach, and of the superior intestines, together with any certain quantity of any fluid that may be present within the cavity of the head, chest, or abdomen. Having agitated this mixture for some time in distilled water and filtered it, proceed to the following experiments. (*a*) To a small quantity of the liquid, add a few drops of a solution of caustic potash in alcohol. (*b*) To this, add a few drops of sulphate of iron, and if prussic acid be present, a cloudy and reddish precipitate, of the colour of burnt terra-siena will fall down. (*c*) Now introduce some sulphuric acid, when the colour of the precipitate will instantly change to that of a bluish-green, which, by a permanent contact with the atmospheric air, becomes gradually of a beautiful blue. Or, (*a*) treat the filtered liquor with carbonate of potash; (*b*) add a solution of sulphate of iron with a small quantity of alum. A precipitate, as in the former method, will fall down, which, if treated by (*c*) sulphuric acid will also become blue and pulverulent. During this last experiment, carbonic acid gas is disengaged. The precipitate, which is a true Prussian blue, may also be decomposed.§

Antidotes. Where a substance acts with such tremendous vigour, it is difficult to present an antidote, which shall counteract its effects. And accordingly we know of none that deserves the name. Dr. Granville recommends brandy and water, with perhaps some liquid ammonia—and the latter in combination with diluted camphorated spirit, or oil of turpentine, as the most efficacious.*

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* Orfila, vol. 2, p. 142 to 146.

† See his experiments in the Lond. Med. Rep. vol. 3, p. 243 to 249.

‡ Essay on Prussic Acid, by Davis and Parent.—Amer. Med. Rec. vol. 2. p. 573. Experiments by Dr. *Davie*, Eclectic Repertory, vol. 10, p. 246. A few drops thrown on the eye of a cat, caused death.—Annals of Philosophy, vol. 12, p. 23. It is here stated that Magendie dipped a rod into the acid prepared according to Gay Lussac's method, and brought it in contact with the tongue of an animal. Death ensued before the rod could be withdrawn. See also Gay Lussac's Essay on Prussic Acid, in the Annals, vols. 7 and 8; and Magendie's, in Brande's Journal, vol. 4, p. 347.

§ New-England Journal, vol. 10, p. 362.

Caustic potash, when combined with prussic acid, previous to its administration, destroys its poisonous effects, and it has hence been suggested as an antidote; but, in the experiments where it was used, it failed in counteracting the effects.†

Prussic acid is also the poisonous ingredient in several vegetables, such as the

Prunus lauro-cerasus. (Cherry-laurel.)
Amygdalus communis. (Bitter almonds.)
Amygdalus persica. (The *Peach*, its kernels, leaves, and flowers.)
Prunus Avium. (Black cherry, its kernels.)
Prunus Padus.‡ (*Bird cherry-tree*, its bark.)

As prussic acid is characterized by an odour similar to that of bitter almonds, it has been conjectured, that all substances possessing this odour contain prussic acid; and experiments, so far as they have advanced, somewhat confirm this opinion.

Prunus lauro cerasus. The distilled water of this plant has been proved a poison by numerous experimenters.§ I shall very briefly notice the results obtained.

When applied to wounds in animals, it induced vomiting, convulsions, great prostration of strength, diminished sensibility, and death. Injected into the stomach and rectum, it excited a similar train of symptoms, except that, in the latter, the convulsions were more violent, and tetanus of the extremities was present. Its action was most rapid and intense when injected into the jugular vein.||

Several cases are recorded of its effects on the human subject. One of the earliest happened in Dublin in 1728. Martha Boyce, servant to a person who sold large quantities of this water, gave to her

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* New-England Journal, vol. 10, p. 361. Mr. John Murray also recommends ammonia, as he has recovered several animals to whom large doses were given, by dropping it into their mouths.—Edinburgh Phil. Journal, vol. 7, p. 124.

† Orfila, vol. 2, p. 194. Edinburgh Med. and Surg. Journ. vol. 13, p. 208. American Med. Recorder, vol. 2, p. 536 to 540.

‡ Schrader, an apothecary at Berlin, was the individual who discovered that the prussic acid is contained in the aqua lauro-cerasi and the distilled water of the flowers of the peach-tree, as likewise in the infusion of bitter almonds.—London Med. and Phys. Journal, vol. 10, p. 95. Bergmann, also an apothecary at Berlin, discovered in 1811, that the bark of the prunus padus contained a notable quantity of it.—Annals of Philosophy, vol. 5, p. 28. See also a paper by Vauquelin, on the presence of prussic acid in vegetables, from the *Annales de Chimie*. Repertory of Arts, 2d series, vol. 2, p. 461. He detected this substance in the kernels of apricots.

§ Orfila enumerates the following: Madden, Mortimer, Browne, Langrish, Nicholls, Stenzelius, Heberden, Watson, Vater, Rattray, the Abbé Rozier, Duhamel, and Fontana.

|| Orfila, vol. 2, p. 148 to 158. Also an analysis of the experiments of Fontana, in the Med. Commentaries, vol. 12, p. 106.

mother a bottle of it, and by the latter it was given to Frances Eaton, her sister. Mrs. Eaton was a shopkeeper, and thinking it a compliment to her customers, offered them some. Among others, one Mary Whaley drank of it; went to another shop, and in about a quarter of an hour, complained of a violent disorder in her stomach. She was carried home, and from that time lost her speech, and died in about an hour, without vomiting or purging, or any convulsions. Mrs. Ann Boyce was informed of this, and came immediately to her sister. She affirmed that it could not have been the cordial that caused death, and to convince her of it, she filled out three spoonfuls and drank it, and shortly after, two more. In a few minutes she died, without a groan or convulsions.*

Foderè says, that when he was attending his studies at Turin in 1784, the chamber-maid and man-servant of a noble family of that town, stole, for the purpose of regaling themselves, from their master, a bottle of distilled laurel-water, which they took for an excellent cordial. Fearful of being surprised, they hastily swallowed, one after the other, several mouthfuls of it, but they soon paid the price of their dishonesty, for they expired almost instantly in convulsions. The dead bodies were carried to the university for examination. The stomach was found highly inflamed, but the rest of the organs were in a sound state.†

It has also formed the subject of investigation in a very interesting criminal trial, whether this substance was the cause of death; and as cases of criminal poisoning by vegetable substances are very rare, I shall present a full abstract of it. The trial was that of Capt. Donellan for the murder of Sir T. Boughton.

Sir Theodosius Boughton was a young gentleman of fortune, in the county of Warwick in England, and nearly arrived at the age of twenty-one. His mother, and his brother-in-law Capt. Donellan, and his sister, (Mrs. Donellan,) resided with him. In the event of his dying before the period of his majority, the greatest part of his fortune descended to his sister, and Capt. Donellan would thus become entitled to a life estate in it.

Sir Theodosius was labouring under a slight venereal affection, for which he was attended by Mr. Powell, an apothecary at Rugby. His general health is, however, stated to have been good. On the 29th of August, 1780, Mr. Powell sent him a draught to be taken on the next morning, consisting of rhubarb and jalap, each fifteen grains; spirits of lavender, twenty drops; nutmeg-water, two drachms; simple syrup, two drachms, and an ounce and a half of simple water. The bottle containing this draught was placed on a shelf in his bed-room.

Sir Theodosius returned in the afternoon of this day from fishing, in good health and spirits. In the morning, a servant awoke him at an early hour, for the purpose of obtaining some straps for a net. He arose, and went into the next room for them. Even now he appeared in perfect health. About 7 A. M. Lady Boughton got up and went into his room, as he had before desired her to give him the medicine. She enquired whether he had taken it, or whether he chose that she should give it to him. He desired her to reach down the draught, which was labelled—"Purging draught for Sir T. B." and she poured it into a cup, for the purpose of his taking it. He had not, however, swallowed more than half of it, when he complained that it was so nauseous to the taste, and disagreeable to the smell, that he did not apprehend he should be able to keep it on his stomach. This remark induced Lady Boughton to smell the draught. She found it very peculiar in this respect, and observed to him, that it smelt very strongly of bitter almonds. He eat some cheese, in order to take the taste out of his mouth, and afterwards washed his mouth with some water. In about two minutes after swallowing the draught, he appeared to struggle very much, as if to keep it down, and had a rattling and guggling at his stomach. These symptoms continued about ten minutes, when he seemed to Lady Boughton to be inclined to go to sleep, and she left the room. She returned again in about five minutes, and was surprised to find him with his eyes fixed upwards, his teeth clenched, and froth running out of his mouth. He died in about half-an-hour afterwards, having never spoken since he took the draught.

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* Phil. Transactions, vol. 37, p. 84. Communicated by Dr. Madden. His experiments on animals are also contained in the same article. Dr. Mortimer's, in vol. 37, p. 163. Fontana's, in vol. 70, p. 163.

† Foderè, vol. 4, p. 27.

Capt. Donellan came into the room when Sir Theodosius was dying, and inquired of Lady Boughton where the physic-bottle was. She showed it to him. He immediately took and poured water into it, shook it, and then emptied its contents into the wash-hand basin. And he persisted in doing this with another bottle, although Lady Boughton remonstrated, and objected to his conduct. Mr. Powell was sent for, but arrived after the death of Sir Theodosius.

It appeared also in evidence, that Capt. Donellan had a still in his own room, and that he had used it for distilling roses. Some days after the death of Sir T. he brought this still to one of the servants to be cleaned. It was full of lime, and the lime was wet. On the other hand, it appeared, on the cross-examination of Lady Boughton, that Sir T. a short time before his death, had bought a quantity of arsenic, in order to poison fish, and some of this was afterwards found locked up in his closet.

Suspicions soon began to be excited as to the cause of this sudden decease, and when these reached the ears of Sir William Wheeler, the guardian of the young baronet, he wrote to Captain Donellan, informing him of the rumours that were abroad, and requesting him to have the body opened, in order to satisfy the family and the public. Donellan, in his answer, immediately consented to this, and sent for some medical gentlemen. He, however, did not explain to them the cause of his request; and as they were thus led to suppose it merely an ordinary case, they declined the performance, from the circumstance that the body was already far advanced in a state of putrefaction. It is not necessary, nor indeed does it belong to this statement, to enumerate the various devices by which Captain Donellan evidently attempted to elude the wishes of Sir William Wheeler respecting a dissection. On the eighth day after death, the body was buried, but it was taken up immediately after by the coroner, and opened. It was found swoln and distended, the face was black, the lips swoln and retracted, and showing the gums, the teeth black, the tongue protruding, and the skin spotted in many parts of the body. "The orifices and small arch of the stomach, and the intestines, bore the appearance of inflammation; the heart was natural, the lungs were suffused with blood, looking red and spotted in many places, with black specks; and on the back part, the blood had settled in a deep-red colour, almost approaching to purple; the diaphragm was in the same state, and in general, upon the depending surfaces of the body, the blood was settled in the like manner: the kidneys appeared black as tinder, and the liver much in the same state." There was also some blood extravasated in the thorax.

Several physicians and surgeons, (Dr. Rattray, Dr. Ashe, Dr. Parsons, professor of anatomy at Oxford, and Mr. Wilmer,) deposed, that they had performed experiments on animals with laurel-water, and found the effects very similar to the symptoms in the case of Sir Theodosius. Death succeeded in a few minutes, after having been preceded by convulsions. The appearances on dissection also agreed.

It may be mentioned in this place, that Mr. Powell prepared a draught precisely alike to that which he had sent to the baronet, with the addition of some laurel-water; and Lady Boughton, on being requested to smell this, stated that it resembled the one she had given to her son.

The counsel for the prisoner, in their cross-examination, enquired of the medical witnesses, whether the presence of epilepsy or apoplexy would not account for the symptoms observed? To this a negative answer was given. Dr. Parsons thought they resembled the latter most, but he was decided in attributing them to the effects of the medicine. Sir Theodosius was young, and of a thin habit, and it was hence very improbable that apoplexy should have caused his death.

They also enquired, whether the appearances observed on dissection might not be the effects of putrefaction. It was allowed that the external might, but not the internal.

On the part of the prisoner, the celebrated JOHN HUNTER was summoned as a witness. As this is probably the only time when that distinguished surgeon appeared before a court, to testify on a case of poisoning, and as his examination is peculiarly interesting, I conceive that I shall do a service by quoting it entire.

MR. JOHN HUNTER *sworn; examined by Mr. Newnham.*

Q. Have you heard the evidence that has been given by these gentlemen?

A. I have been present the whole time.

Q. Did you hear Lady Boughton's evidence?

A. I heard the whole.

Q. Did you attend to the symptoms her Ladyship described, as appearing upon Sir Theodosius Boughton after the medicine was given him?

A. I did.

Q. Can any certain inference, upon physical or chirurgical principles, be drawn from those symptoms, or from the appearances externally or internally of the body, to enable you, in your judgment, to decide that the death was occasioned by poison?

A. I was in London then; a gentleman who is in court waited on me, with a copy of the examination of Mr. Powell and Lady Boughton, and an account of the dissection, and the physical gentlemen's opinion upon that dissection.

Q. I don't wish to go into that, I put my question in a general way.

A. The whole appearances upon the dissection explain nothing but putrefaction.

Q. You have been long in the habit of dissecting human subjects? I presume you have dissected more than any man in Europe?

A. I have dissected some thousands during these thirty-three years.

Q. Are those appearances you have heard described such, in your judgment, as are the result of putrefaction in dead subjects?

A. Entirely.

Q. Are the symptoms that appeared after the medicine was given, such as necessarily conclude that the person had taken poison?

A. Certainly not.

Q. If an apoplexy had come on, would not the symptoms have been nearly or somewhat similar?

A. Very much the same.

Q. Have you ever known or heard of a young subject dying of an apoplectic or epileptic fit?

A. Certainly; but, with regard to the apoplexy, not so frequent; young subjects will perhaps die more frequently of epilepsies than old ones; children are dying every day from teething, which is a species of epilepsy arising from an irritation.

Q. Did you ever, in your practice, know an instance of laurel-water being given to a human subject?

A. No, never.

Q. Is any certain analogy to be drawn from the effects of any given species of poison upon an animal of the brute creation, to that it may have upon a human subject?

A. As far as my experience goes, which is not a very confined one, because I have poisoned some thousands of animals, they are very nearly the same; opium, for instance, will poison a dog similar to a man; arsenic will have very near the same effect upon a dog as it would have, I take for granted, upon a man; I know something of the effects of them, and I believe their operations will be nearly similar.

Q. Are there not many things which will kill animals almost instantaneously, that will have no detrimental or noxious effect upon the human subject; spirits, for instance, occur to me?

A. I apprehend a great deal depends upon the mode of experiment; no man is fit to make one but those who have made many, and paid considerable attention to all the circumstances that relate to experiments. It is a common experiment, which I believe seldom fails, and is in the mouth of every body, that a little brandy will kill a cat; I have made the experiment, and have killed several cats, but it is a false experiment; in all those cases where it kills the cat, it kills the cat by getting into her lungs, not into her stomach, because if you convey the same quantity of brandy, or three times as much, into the stomach in such a way as the lungs shall not be affected, the cat will not die; now, in those experiments that are made by forcing an animal to drink, there are two operations going on; one is a refusing the liquor by the animal, its kicking and working with its throat to refuse it; the other is a forcing the liquor upon the animal; and there are very few operations of that kind but some of the liquor goes into the lungs. I have known it from experience.

Q. If you had been called upon to dissect a body, suspected to have died of poison, should you or not have thought it necessary to have pursued your search through the guts?

A. Certainly.

Q. Do you not apprehend that you would have been more likely to receive information from thence than any other part of the frame?

A. That is the track of the poison, and I certainly should have followed that track through.

Q. You have heard of the froth issuing from Sir Theodosius' mouth a minute or two before he died; is that peculiar to a man dying of poison, or is it not very common in many other complaints?

A. I fancy it is a general effect of people dying in what you may call health, in an apoplexy or epilepsy; in all sudden deaths, where a person was a moment before that in perfect health.

Q. Have you ever had an opportunity of seeing such appearances upon such subjects?

A. Hundreds of times.

Q. Should you consider yourself bound, by such an appearance, to impute the death of the subject to poison?

A. No, certainly not; I should rather suspect an apoplexy, and I wish in this case the head had been opened, to remove all doubts.

Q. If the head had been opened, do you apprehend all doubts would have been removed?

A. It would have been still farther removed, because, although the body was putrid so that one could not tell whether it was a recent inflammation, yet an apoplexy arises from an extravasation of blood in the brain, which would have laid in a coagulum. I apprehend, although the body was putrid, that would have been much more visible than the effect any poison could have had upon the stomach or intestines.

Q. Then in your judgment, upon the appearances the gentlemen have described, no inference can be drawn from thence that Sir Theodosius Boughton died of poison?

A. Certainly not; it does not give the least suspicion.

Cross-examined by Mr. Howorth.

Q. Having heard the account to-day, that Sir Theodosius Boughton, apparently in perfect health, had swallowed a draught which produced the symptoms described, I ask you whether any reasonable man can entertain a doubt that that draught, whatever it was, produced those appearances?

A. I don't know well what answer to make to that question.

Q. Having heard the account given of the health of this young gentleman on the morning previous to taking the draught, and the symptoms that were produced immediately upon taking the draught, I ask your opinion, as a man of judgment, whether you don't think that draught was the occasion of his death?

A. With regard to his being in health, that explains nothing; we frequently, and indeed generally, see the healthiest people dying suddenly, therefore I shall lay little stress upon that; as to the circumstances of the draught, I own they are suspicious; every man is as good a judge as I am.

Court. You are to give your opinion upon the symptoms only, not upon any other evidence given.

Mr. Howorth. Upon the symptoms immediately produced after the swallowing of that draught, I ask whether, in your judgment and opinion, that draught did not occasion his death? A. I can only say that it is a circumstance in favour of such an opinion.

Court. That the draught was the occasion of his death? A. No: because the symptoms afterwards were those of a man dying, who was before in perfect health; a man dying of an epilepsy or apoplexy, the symptoms would give one those general ideas.

Court. It is the general idea you are asked about now, from the symptoms that appeared upon Sir Theodosius Boughton, immediately after he took the draught, followed by his death so very soon after; whether upon that part of the case you are of opinion that the draught was the occasion of his death?

A. If I knew the draught was poison, I should say, most probably, that the symptoms arose from that; but when I don't know that that draught was poison, when I consider that a number of other things might occasion his death, I cannot answer positively to it.

Court. You recollect the circumstance that was mentioned of a violent heaving in the stomach? A. All that is the effect of the voluntary action being lost, and nothing going on but the involuntary.

Mr. Howorth. Then you decline giving any opinion upon the subject? A. I don't form any opinion to myself; I cannot form an opinion, because I can conceive if he had taken a draught of poison, it arose from that; I can conceive it might arise from other causes.

Q. If you are at all acquainted with the effects and operations of distilled laurel-water, whether the having swallowed a draught of that would not have produced the symptoms described?' A. I should suppose it would; I can only say this of the experiments I have made of laurel-water upon animals, it has not been near so quick; I have injected laurel-water directly into the blood of dogs, and they have not died; I have thrown laurel-water, with a precaution, into the stomach, and it never produced so quick an effect with me as described by those gentlemen.

Q. But you admit that laurel-water would have produced symptoms such as have been described?

A. I can conceive it might.

Mr. Newnham. Would not an apoplexy or epilepsy, if it had seized Sir Theodosius Boughton at this time, though he had taken no physic at all, have produced similar symptoms too? A. Certainly.

Q. Where a father has died of apoplexy, is that not understood, in some measure, to be constitutional?—A. There is no disease whatever that becomes constitutional, but what can be given to a child. There is no disease which is acquired, that can be given to a child; but whatever is constitutional in the father, the father has a power of giving that to the children; by which means it becomes what is called hereditary; there is no such thing as an hereditary disease; but there is an hereditary disposition for a disease.

Mr. Howorth. Do you call apoplexy constitutional?—A. We see most diseases are constitutional; the small-pox is constitutional, though it requires an immediate cause to produce the effects. The venereal disease is hereditary. I conceive apoplexy as much constitutional as any disease whatever.

Q. Is apoplexy likely to attack a thin young man who had been in a course of taking cooling medicines before?—A. Not so likely, surely, as another man; but I have, in my account of dissections, two young women dying of apoplexies

Q. But in such an habit of body, particularly attended with the circumstance of having taken cooling medicines, it was very unlikely to happen?—A. I do not know the nature of medicines so well as to know that it would hinder an apoplexy from taking effect.

Court. Give me your opinion in the best manner you can, one way or the other, whether, upon the whole of the symptoms described, the death proceeded from that medicine, or any other cause?—A. I do not mean to equivocate, but when I tell the sentiments of my own mind, what I feel at the time, I can give nothing decisive.

The judge, (the Hon. Francis Buller) in summing up the evidence, after stating that four medical witnesses were decided in attributing the death to the effects of laurel-water, made the following comments on the testimony of Mr. Hunter: "For the prisoner, you have had one gentleman called, who is likewise of the faculty, and a very able man. I can hardly say what his opinion is, for he does not seem to have formed any opinion at all of the matter. He, at first, said he could not form an opinion whether the death was or was not occasioned by the poison, because he could conceive that it might be ascribed to other causes. I wished very much to have got a direct answer from Mr. Hunter, if I could, what, upon the whole, was the result of his attention and application to the subject, and what was his present opinion, but he says he can say nothing decisive. So that, upon this point, if you are to determine upon the evidence of the gentlemen who are skilled in the faculty only, you have the *very positive* opinion of four or five gentlemen of the faculty, that the deceased died of poison. On the other side, you have what I really cannot myself call more than the *doubt* of another: for it is agreed by Mr. Hunter, that the laurel-water would produce the symptoms which are described. He says an epilepsy or apoplexy would produce the same symptoms; but as to an apoplexy, it is not likely to attack so young and so thin a man as Sir Theodosius was; and, as to an epilepsy, the other witnesses tell you, they don't think the symptoms which have been spoken of, do show that Sir Theodosius had any epilepsy at the time."

The jury retired for about an hour, and then brought in a verdict of guilty, and Capt. Donellan was executed in a few days thereafter.*

It was, and still is, a prevailing opinion with many, that Sir Theodosius Boughton was not poisoned, and that Captain Donellan was innocent. Dr. Male notices this case, as "a melancholy and striking instance of the unhappy effects of popular prejudice, and the fatal consequences of medical ignorance."† Mr. Phillips, in his "Theory of Presumptive Proof," adduces it as an instance where a man was unwarrantably condemned on circumstantial evidence.‡

I cannot agree with either of these gentlemen, although I will readily allow that too much dependence was placed on the appearances found on dissection. Putrefaction was evidently too far advanced to render them a certain ground of testimony.

As a medical man, it might be enquired of Dr. Male, whether the symptoms preceding this death have not been most strikingly and astonishingly verified, as probably originating from laurel-water, by the subsequent investigations of chemists and physicians. Mr. Hunter in his testimony, says, that he had never known laurel-water to act so rapidly as the other medical witnesses described. He had injected it into the veins and into the stomach of animals, *but it never produced so quick an effect*. Who, I would ask Dr. Male, have subsequent experiments proved to be right on this point? Mr. Hunter, or the other witnesses. Let the facts I have adduced in previous pages answer this question.

Again, Mr. Phillips, and others, object greatly, that the whole proof as to its being laurel-water rested upon the comparison of the smell. Now I conceive this to be a very satisfactory circumstance. The medicine administered by Mr. Powell did not contain laurel-water—while few, very few indeed, of the fluids in common use, possess a smell at all resembling that of bitter almonds. This property is peculiar—confined to a certain number of vegetable products, several of which, even at that day, were known to be deleterious.

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* This abstract is taken from a folio pamphlet, entitled "The Trial of John Donellan for the wilful Murder of Sir Theodosius Edward Allesley Boughton, Bart. at the Assize at Warwick, on Friday, March 30, 1781, before the Hon. Francis Buller, Esq. one of the Justices of his Majesty's Court of King's Bench. The second edition. Taken in short-hand by Joseph Gurney." London, 1781.

† Male, p. 86. ‡ Appendix to his Treatise on the Law of Evidence, p. [illegible]

Captain D. had a still in his own room—there were laurels and bays in the garden, (see Amos' testimony.) This is a sufficient answer to Mr. Phillips' question, *where did the prisoner procure it?* Certainly, if there was an intention on the part of Captain Donellan, to use the laurel-water for the purpose of poisoning, we have shown *how he could obtain it.*[*]

I have made these few remarks on this case, not for the purpose of asserting positively that Sir Theodosius Boughton was poisoned, but to state a few circumstances, which tend to shew that this was not an instance of *judicial murder*, for such I apprehend it must be considered by the critics on it.

" Dr. Male," says Dr. Smith, " states in so many words, *that it was neither proved that the deceased was poisoned, nor that any poison had existed.* Equally dissatisfied, perhaps with the manner in which the professional testimony was given, the evidence of the eminent individual upon whom he founds this opinion, *has not led me to draw the same conclusion.*"[†]

The *oil of laurel* also acts as a virulent poison, and in a similar manner to the *distilled water*. The *watery extract*, however, according to Orfila, is very feeble, and comparatively innoxious in its operation.

Amygdalus communis. (Bitter almonds.) These, when pounded and taken in sufficient quantity, prove highly deleterious, as has been proved by numerous experimenters.[‡]

The essential oil of bitter almonds acts violently. One drop, applied to the tongue of a cat, instantly excited convulsions, to which loss of motion and insensibility succeeded—the respiration became hurried, and death followed at the end of five minutes. So also when two drops were injected into the rectum. While performing these experiments, Mr. Brodie touched his tongue with the probe that had been dipped into the oil. He instantly experienced an uneasy sensation in the epigastric region, and a weakness of the limbs. The application of the oil to the cellular texture was equally, but not instantaneously, destructive.[§]

Two cases are said to have occurred at Montpelier, of children poisoned by the use of bitter almonds. In one, the person had eaten them after they had been heated in a copper vessel; and in the other the child had been made to drink the milk, as a remedy against worms.[*]

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[*] The fact of Captain Donellan's having a still, is cautiously omitted in Mr. Phillips' statement of the case. Nor is this a solitary instance of omission; and in proof of this, I request any gentleman to compare the abstract I have given, (and which is taken almost verbatim from the trial,) with that presented by Mr. Phillips. His comments on the medical testimony are evidently founded on imperfect information concerning the subject in dispute.

[†] Smith's Forensic Medicine, p. 171.

[‡] Orfila, vol. 2, p. 160.

[§] Brodie's Experiments on Vegetable Poisons, from the Phil. Trans. in Eclectic Repertory, vol. 2, p. 272, 279.

Virey has suggested the sulphate of iron as an antidote of this substance, in consequence of restoring a cow by it, who was nearly killed by the essential oil.[†]

Amygdalus persica. The kernels of the peach are very often distilled for the purpose of impregnating *eau de noyau*, and if too strongly charged with the oil, it must prove noxious. The late Duke Charles of Lorraine nearly lost his life by swallowing a small quantity of this liquor,[‡] and fatal cases are said to have lately occurred in England from the same cause.[§]

Lactuca virosa. (Strong-scented lettuce.) The extract of this plant, in large doses, produces effects similar to those of opium, but a longer period is required to develope them. It acts with more rapidity when applied to the cellular texture, or injected into the veins.

Solanum dulcamara. (Woody nightshade.) A native of the United States. It has been supposed that this, and other species of the same genus, (*Solanum nigrum*, *villosum*, *fuscatum*, &c.) were poisonous, but the experiments of Dunal and Orfila evidently prove that they possess very moderate narcotic powers.[||]

Taxus baccata. (The yew.) Great diversity of opinion has existed concerning the properties of this plant. Orfila, however, deems it a narcotic.

Dr. Percival relates, that the fresh leaves were administered to three children, of five, four, and three years of age, near Manchester, for worms. Yawning and listlessness soon succeeded, and the oldest vomited a little, and complained of pain in the abdomen; but the others expressed no sign of pain. They all died within a few hours of each other.[¶]

Actæa spicata. (Herb Christopher. Bane-berries.) A native of the United States. The berries of this plant are noxious, according to the testimony of Linnæus, Colden, and Le Monnier. It is poisonous to cattle, but sheep and goats eat it.

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[*] London Med. and Phys. Journal, vol. 11, p. 92.

[†] London Med. Repository, vol. 8, p. 178. Vogel and Robiquet have lately examined the nature of the volatile oil of bitter almonds with considerable minuteness. When exposed to the air for a few minutes, it becomes a crystalline mass, and loses its odour. The volatile part proved excessively poisonous, while the crystallizable matter was found by Robiquet to be quite inert.—Brande's Journal, vol. 13, p. 404, and vol. 15, p. 155. Vogel's analysis of bitter almonds is given in Annals, vol. 11, p. 246.

[‡] London Med. Repository, vol. 4, p. 15.

[§] An oil is also obtained by distilling the leaves.—See Brugnatelli's Experiments, in Annals, vol. 7, p. 395.

[||] Orfila, vol. 2, p. 164. Desfosses has, however, lately announced the presence of a narcotic principle in the *Solanum nigrum*, and which he styles *Solanine*. It produces great somnolency, the evacuation of much glairy and mucous matter from the intestines, and sickness at the stomach.—Chapman's Journal, vol. 4, p. 216, and vol. 5, p. 96.

[¶] Med. Commentaries, vol. 6, p. 33. It is also mentioned, that a drove of cattle (twelve in number) were poisoned in December, 1814, in Montgomeryshire, (Wales,) from eating the branches of this tree.—Edinburgh Annual Register, vol. 7, p. 169. Two cases of death from its leaves and berries are mentioned by Metzger, p. 337.

Physalis somnifera, *Azalea pontica*, and *Peganum harmela*, are deemed narcotics.

Ervum ervilia. (Lentil.) Food into which the seed of this plant enters, is said to produce weakness and paralysis of the lower extremities.

The seeds of the *Lathyrus cicera* have similar properties.*

Paris quadrifolia. (Herb Paris,) occasions vomitings and spasms. The root of *paris polyphylla* is also said to be highly poisonous.†

I venture to add to these the following:—

Gelseminum nitidum of Michaux. (Yellow jessamine.) The flowers, root, &c. of this shrub are narcotic, and the effluvia from the former are said sometimes to induce stupor.‡ In the newspapers of May, 1823, it is mentioned, that a child of Mr. James Broughton, of New Carolina, aged two years, died in the space of half-an-hour after eating the flowers of this plant. Blindness ensued within a minute or two after swallowing them.

The general treatment recommended in cases of poisoning with opium, is proper in all cases which we have not particularly noticed.

3. NARCOTICO-ACRID POISONS.

This title is evidently an incorrect one, since some of the substances belonging to the class do not excite any rubefaction on the texture to which they are applied, while the narcotic nature of others is extremely doubtful. We adopt it, however, for reasons already assigned.

Atropa belladonna. (Deadly nightshade.) The berries of this plant are highly noxious. A detachment of several hundred French soldiers, having halted at a short distance from Pirna, near Dresden, were allured by the inviting appearances of the berries of the atropa, which grew in abundance in the neighbourhood. They accordingly eat freely of them, and one hundred and eighty men were thus poisoned, many of whom died before professional assistance could be rendered, and the rest were long in recovering. The following were the symptoms, as related by M. Gaultier de Claubry, the medical officer in attendance. Dilatation and immobility of the pupils—total insensibility of the eye to the presence of external objects, or very confused and indistinct vision—the conjunctiva turgid with purple-coloured blood—prominence of the eye, which, in some, appeared dull and heavy, in others, bright and furious—great dryness of the lips, tongue, palate and throat—deglutition difficult, in some cases nearly impossible—nausea, not followed by vomiting—sense of weakness, lypothymia, syncope—inability to stand upright—bending forward of the trunk of the body—continual movement of the hands and fingers—lively delirium, accompanied with a silly laugh—aphonia or inarticulate sounds uttered with difficulty—ineffectual inclination to intestinal evacuation—very gradual return to health and reason, without any recollection of the preceding state.*

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* Orfila, vol. 2, p. 166. † Edin. Phil. Journal, vol. 1, p. 880.

‡ Elliot's Botany of South Carolina and Georgia, vol. 1, p. 312.

Several cases are also recorded by Orfila and other authors, where death followed from eating the berries, but the above is sufficient to illustrate the ordinary effects. In one instance where death ensued, the stomach was found ulcerated.†

It appears from a case related by Ray, that even the external application of the fresh leaf to the broken skin, is not unattended with danger.‡ The dilatation of the pupil of the eye from the application of this substance, is well known, and has been extensively applied in modern surgery.

The watery extract of belladonna, when administered to animals, produced vomiting, dilatation of the pupils, delirium, and, in general, the same course of symptoms as in man. The stomach was sometimes ulcerated or red, and at other times sound. The lungs and heart occasionally livid.§

Datura stramonium. (Thorn-apple. Jamestown weed.) Its native country doubtful, but naturalized in every part of the United States. (Bigelow.) This plant has extended itself rapidly over various parts of our country, and is certainly one of the most offensive.‖ There are numerous cases on record of the poisonous effects of the leaves and seeds of it.

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* Orfila, vol. 2, p. 201. New-England Journal, vol. 4, p. 92.

† Orfila, vol. 2, p. 201. Foderè, vol. 4, p. 39. Sage saw fourteen children who had eaten of the berries. They could not swallow, and the pupils were immoveable. They became drunk and furious, leaping and running. The one who had taken most, suffered under spasmodic twitchings, and discharged blood by the nose and anus, and vomited bloody and purulent matter. On recovering the power of deglutition, it was found that the whole roof of his mouth, his tonsils, and part of his tongue, were covered with aphthæ. They all survived, but on going to school four days thereafter, some saw red, others not at all, and none were able to articulate a sound. Of this they gradually recovered.—Edin. Med. and Surg. Journal, vol. 9, p. 380.

‡ London Med. and Phys. Journal, vol. 12, p. 184.

§ A vegetable alkali has been discovered in this plant by Brande, which he terms *Atropia.* The vapour of it was so injurious, producing violent head-ache, pain in the back, giddiness and nausea, that he was obliged to discontinue his experiments. On tasting a small quantity of the sulphate of atropia, violent head-ache, shaking of the limbs, oppression and difficult circulation were induced, and Mr. Brande found even the vapour of the different salts to produce giddiness.—Annals of Philosophy, new series, vol. 1, p. 270. There are also experiments of Vauquelin on that part of the juice of belladonna which is soluble in alcohol, quoted in the London Med. and Phys. Journal, vol. 28, p. 209, from the Annales de Chimie.

‖ Dr. Barton remarks, that it grows in great abundance about Vincennes, and was introduced there about the year 1785. "The plant," he adds, "is cut down by legal order, for the inhabitants assert that they were never affected with remitting fevers until the datura was introduced among them. The effluvia arising from the leaves, stem, and flowers, are supposed to have given origin to the disease."—Barton's Med. and Phys. Journal, vol. 1, p. 145. This is evidently laying too much on the plant, but its effluvia is certainly noxious.

Dr. Bartom states, that, in 1765, when some of the British troops under Sir John St. Clair, were stationed in the vicinity of Elizabeth-town, (New-Jersey,) three of the soldiers collected a quantity of the plant, (which they mistook for lamb's-quarters, *Chenopodium album*,) and dressed and ate it. One of them became furious, and ran about like a madman. The second was seized with genuine tetanus, and died.*

Dr. Rush saw a child, between three and four years old, who had swallowed some of the seeds. A violent fever, delirium, tremors in the limbs, and a general eruption on the skin, were present, accompanied with considerable swelling, itching, and inflammation. Repeated emetics and purgatives, however, alleviated the disease, and brought away some of the seeds. Dilatation of the pupils and blindness still remained, but were obviated by a continuance of the previous remedies, and she recovered her health.†

In the Transactions of the College of Physicians of Philadelphia, Dr. Moses Bartram relates, that he was called to a child suddenly seized with idiotcy, without fever. The pulse was natural—tongue clear, and no internal function disturbed, except those of the brain. The child appeared very happy—talking, laughing, and in constant motion, yet so weak that it could not stand or walk without tottering. He exhibited an emetic, and the seeds of the thorn-apple were rejected, after which the child recovered.‡

Orfila enumerates the following list of symptoms as produced by this plant: "Intoxication, delirium, loss of sense, drowsiness, a sort of madness and fury—loss of memory, sometimes transitory, and sometimes permanent—convulsions, paralysis of the limbs, cold sweats, and excessive thirst and tremblings."

The stramonium was some years since used to a considerable extent in asthma, and there is reason to believe that, in some cases, it proved deleterious.§

The stomach of animals poisoned with the watery extract, by introduction into that organ, was found inflamed, and blood was extravasated between the mucous coat and the one subjacent to it. The lungs were of a deep-red, and distended with black and fluid blood.*

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* Barton's Med. and Phys. Journal, vol. 1, p. 146.

† Trans. Amer. Phil. Society, vol. 1, p. 384.

‡ Other cases are related by *Dr. Fowler*, (Med. Commentaries, vol. 5, p. 164.) Here the face, eyes, and abdomen were swelled. The other symptoms were, however, similiar to those mentioned in the text. By *Dr. Thomas Young*, (Edinburgh Med. and Surg. Journal, vol. 15, p. 154.) By *M. Sarlandiere*, (Journal Foreign Science, vol. 1, p. 463.) By *Dr. Brown*, (New-York Med. Repository, vol. 5, p. 36.) A scarlet efflorescence was here present, and the pupils were dilated. Two cases by *Dr. De Witt*, (Ibid. vol. 2, p. 27.) In one instance the poison produced pain, and during recovery, there were numerous vesications on the skin.—And also by *Orfila*, from various authors. A remarkable case by *Orfila* himself, is given in the London Med. Repository, vol. 13, p. 259, where it produced most of the symptoms of poisoning, but finally was the means of curing an intense and long-continued head-ache. A very interesting historical account of this plant, by Mr. Royston, is contained in the London Med. and Phys. Journal, vol. 25 and 26.

§ See on this point Dr. Bree's Letter on Stramonium, New-England Journal, vol. 1, p. 411.

The *Datura metel*, *ferox* and *tatula*, are equally poisonous. The seeds of the D. metel are used in Asia for their soporific and intoxicating qualities, and are made the instrument of unbounded libertinism.†

Nicotiana tabacum. (Tobacco.) It is not necessary to multiply cases proving the poisonous nature of this substance when taken *internally*. The death of Santeuil, a French poet, was caused by an inconsiderate person emptying the contents of a snuff-box into his wine, which as soon as he had swallowed, excited violent vomiting and excessive pain, and he died in fourteen hours.‡ So also when the infusion, or the smoke, is administered in large quantities, as by a clyster, convulsions, sickness, and vomiting supervene, and death often is the result.§

Externally, the effects are no less striking. A man and his wife fomented their bodies with a watery infusion of tobacco, in order to remove the itch. Giddiness, head-ache, retching, and vomiting, with diarrhœa soon supervened. Thirst accompanied these, as also spasms, and the debility and oppression were great. They were, however, gradually relieved by judicious treatment.‖ A linament, prepared with the powder of tobacco and butter, applied to the heads of children labouring under tinea, caused vertigoes, violent vomitings and faintings, extreme perspiration, and a staggering walk.¶

Several experimenters have examined the effects of tobacco on animals. Fontana found, that the insertion of the oil into wounds induced temporary paralysis, but not death.** Brodie used both the infusion and the oil. The former, when injected into the rectum of an animal, produced faintness, and early insensibility and death. It stopped the circulation of the heart, and caused syncope. The latter excited violent convulsions, frequent respiration, and death, occasioning this termination by destroying the functions of the brain.††

The experiments of Orfila with snuff, produced results generally similar to those we have now related, and they also show, that the extract of the *nicotiana rustica* acts in the same manner as tobacco, but is less active.[*]

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* Brande has also discovered an alkaline principle in this plant, styled *Datura*. —Brande's Journal, vol. 11, p. 204.

† Edinburgh Med. and Surg. Journal, vol. 7, p. 97. See also Royston's paper already quoted.

‡ Orfila's Directions, p. 107.

§ See some remarks on this point, in the Edin. Med. and Surg. Journal, vol. 9, p. 159. A case where the smoking of tobacco produced most of the symptoms of apoplexy, as stertor, insensibility of the pupil, deep livid countenance, and spasmodic contraction, is given in the same work, vol. 12, p. 11.

‖ Med. Commentaries, vol. 11, p. 327.

¶ Orfila, vol. 2, p. 214.

** Med. Commentaries, vol. 12, p. 110. Phil. Trans. vol. 70, p. 163.

†† Eclectic Repertory, vol. 2, p. 274.

Digitalis purpurea, (Purple foxglove.) Dr. William Henry was called in October, 1809, to visit a female, an out-patient of the Manchester Infirmary, and labouring under dropsy, who had taken an overdose of the decoction of foxglove. It was prepared by boiling two handfuls of the leaves in a quart of water, and then pressing the mass, so as to expel the whole of the liquor. Of this, at 7 A. M., she drank two tea-cups full, amounting, in the whole, to not less than ten ounce-measures. Before eight, she began to be sick, and vomited part of the contents of her stomach. Enough, however, was retained to excite violent vomiting and retching, throughout the whole of that and the following day, during which, every thing that was taken was instantly rejected. In the intervals of sickness, she was excessively faint, and her skin was covered with a cold sweat. The tongue and lips swelled, and there was a constant flow of viscid saliva from the mouth. Very little urine was voided on the day she took the digitalis, and on the two following days the action of the kidnies was entirely suspended. When Dr. Henry saw her, which was forty-eight hours after she had taken the poison, the tongue was white, the ptyalism continued, though in a less degree, and the breath was fœtid. The pulse was low, irregular (not exceeding forty,) and after every third or fourth pulsation, an intermission occurred for some seconds. She complained also of general pains in the limbs, and cramps in the legs. By the use of effervescing draughts, and æther with ammonia, she gradually recovered her imperfect health. Dr. Henry remarks, that she had not taken any mercury, and that the ptyalism was entirely the effect of the digitalis.[†]

A man labouring under asthma, imprudently took an ounce of the tincture of digitalis. He immediately fell asleep, and slept for three hours and a half. After this, on awakening, he vomited, and likewise had a motion. He then again slept quietly. A strong emetic was now given, which operated well, and he continued tranquil, and his pulse regular. After two or three hours, however, his pulse began to intermit. Strong punch was given in divided doses, and also carbonate of ammonia. This supported the system, though the pulse was at one period as low as thirty-six in a minute. The intermission lasted for about twelve hours, and *the asthma was cured.*[‡]

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[*] Vauquelin has analysed a variety of tobacco, the *N. latifolia*, and found it to consist of an acrid principle, on which its properties depend. Albumen, supermalate of lime, acetic acid, nitrate and muriate of potash, muriate of ammonia, and a red matter, soluble in alkohol and in water, which swells and is charred by heat. —Edinburgh Med. and Surg. Jour. vol. 6, p. 379.

[†] Edin. Med. and Surg. Journal, vol. 7, p. 148. This symptom has been noticed by other practitioners. Dr. Barton mentions having seen it produced in a child from ordinary doses.—Barton's Med. and Phys. Journal, vol. 1, part 1, p. 80. Another case is related in Ibid. vol. 1, part 2, p. 48. Dr. Barton quotes the following remark from Dr. Withering. "I am doubtful whether it does not sometimes excite a copious flow of saliva."

[‡] Case by Dr. Fogo, in Edin. Med. and Surg. Journal, vol. 18, p. 345.—See

When administered to animals in the form of powder, or extract, or infusion of the leaves, it excites anxiety, melancholy, smallness and slowness of pulse, involuntary stools, and convulsions—death closes the train of symptoms.

Conium maculatum. (Hemlock.) Raving madness and epileptic fits occurred to Mr. Ray in the case of a woman who had eaten the roots of this plant.* Vertigo, convulsions, coma, and death were the result to two soldiers at Waltham Abbey, in Essex, who had boiled it with their bacon for dinner.†

Some soldiers partook of broth into which hemlock had been put. All of them were shortly after seized with pains in the head and throat, and felt as if drunk; but the one who had eaten the most, had lain down and gone to sleep. When first noticed, he was insensible, respiring with great difficulty—his pulse small and slow, even to thirty pulsations in a minute; the extremities were cold, and the face bluish and distended with blood. An emetic was given without effect. He complained of being cold, but shortly after, lost again the use of speech and sense, and died in three hours after taking the poison. On dissection, there were some red spots seen round the pylorus; the intestines were healthy, but all the vessels of the brain were gorged with blood, and, on opening the cranium, there flowed out blood sufficient to fill twice an ordinary chamber-pot.‡

Convulsions, furious delirium, and swellings of the face, appear thus to be among the leading symptoms from the use of this poison.

The juice, and the extract when properly prepared, produces similar effects on animals. Orfila has, however, shown that the extract usually sold in the shops is inefficient and weak.§

Cicuta virosa, or *aquatica*. (Water hemlock.) This is a more violent poison than the preceding.

The following train of symptoms has been noticed—dazzling—obscurity of the sight—vertigo—head-ache, often acute and excruciating—a vacillating walk—anxiety of the præcordia—cardialgia—dryness of the throat—ardent thirst—eructation—vomiting of greenish matter—frequent and interrupted respiration—tetanic contractions of the jaws, sometimes followed by lethargy, with coldness of the extremities; at other times with a furious delirium, or attacks resembling epilepsy. In one or two cases, a swelling of the face has been noticed. In a case where death followed, hiccup and fruitless efforts to vomit were present, with tetanic convulsions. The abdomen and

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also a case quoted from Dr. Beddoes, in Orfila, vol. 2, p. 228. Some useful cautions as to the use of digitalis are given in the Medico-Chirurg. Rev. vol. 1, p. 510. Amer. edit.

[*] Phil. Transactions, vol. 19, p. 634.

[†] Ibid. vol. 43, p. 18. Case by Dr. Watson.

[‡] Case by *M. Haaf*, quoted by Orfila, vol. 2, p. 242.

[§] A drachm of the extract prepared by himself was sufficient to poison a dog; whereas an ounce, and even ten drachms from several of the shops in Paris, produced no effect whatever.—Quart. Jour. For. Med. and Surg. vol. 1, p. 104.

face swelled after death, and there flowed a quantity of green froth from the mouth.[*]

The experiments of Wepfer prove how deadly this plant is to animals, and Linnæus, in his Tour to Lapland, has illustrated it in an impressive manner. At Tornea, hundreds of cattle were annually destroyed in the spring, without any assignable cause. The poison was said to be of so pestilential a nature, that though the animals were flayed before they were cold, yet, wherever their blood came in contact with the human body, it caused gangrenous spots and sores. Some, indeed, had lost their lives in this way. On examining the meadow into which they were first turned out to grass, he found in it a bog or marsh, in which the *Cicuta aquatica* grew in great abundance, and had evidently been plentifully cropped by the cattle in feeding.[†]

Cicuta maculata. (Snake-weed. Amer. hemlock.) A native of this country. We have, unfortunately, several cases on record of death produced by the root of this plant,[‡] and from an examination of these, the following appear as the effects:—Vomiting—pain in the bowels—tenesmus, and occasionally purging—convulsions—dilatation of the pupils—feeble pulse, and frothing at the mouth and nose, mixed with blood. When not convulsed, the patients lay in a deep sleep; the countenance is pale, and the extremities are cold. Several observers have noticed an astonishing mobility of the eye-balls and eye-lashes, although the pupils are firmly and widely dilated. Death follows rapidly, and particularly in children—in two cases, within an hour after eating it.

One dissection has been made by Dr. Hazeltine: The limbs were more flexible than is usual. The stomach was inflated, and contained about three gills of a mucous, greenish fluid, on the surface of which was seen a part of the masticated root. There were no appearances of inflammation.

Brucea antidysenterica. (False angustura bark.) This substance resembles the real angustura, and this fact indeed was noticed, shortly after the discovery of the plant by Mr. Bruce;[§] but it was not until a few years since, that its deleterious nature was discovered. A patient, under the care of Dr. Ramburgh, experienced poisonous effects from the use of a decoction; and death also resulted from it in Hungary and Berne. This led to an examination, and it was ascertained that two species are known in commerce—the genuine, called West Indian, and the spurious East Indian angustura, (brucea.) Several experiments on animals confirmed its poisonous nature. The Austrian government was so impressed with the danger to be apprehended, that it ordered all the angustura bark in the empire, genuine and spurious, to be burnt, and interdicted its future importation. Its sale was also prohibited in Denmark; and in Russia and Wirtemberg, the characters distinguishing each were published by authority.[*] Some of these may be briefly enumerated.

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[*] Orfila, vol. 2, p. 248.

[†] Linnæus' Tour in Lapland, *London edit.* vol. 1, p. 245. See also vol. 2, p. 136, 212. Cows eat it early in the spring, when its growth has just commenced; but as the summer advances, its scent becomes stronger, and warns them to avoid it. It is remarkable, however, that goats devour it with impunity.—London Med. and Phys. Journal, vol. 12, p. 368.

[‡] New-York Med. Repository, vol. 17, p. 303, two cases by *Dr. Ely*, of Dutchess county, in this state. New-England Journal, vol. 7. p. 219, case by *Dr. Haseltine*, of Massachusetts. Ibid. vol. 3, p. 334, by *Dr. Stockbridge*. Dr. Muhlenberg states, in a letter, that it had killed several at Harmony, (Pennsylvania,) who had eaten it instead of angelica.—Med. Repository *ut antea.* This is also probably the plant that is described by Dr. Greenway, of Virginia, under the name of *Cicuta venenosa*, in the Trans. Amer. Phil. Soc. vol. 3, p. 234. See also Bigelow's Med. Botany, vol. 1, p. 128.

[§] See Med. Commentaries, vol. 15, p. 184.

The taste of the genuine is aromatic bitter, that of the spurious, highly and disgustingly bitter. The concentrated infusion of the first is clear and reddish-brown, and when diluted becomes yellow. If an alkali be added, it is changed to a dark-red, and a solution of persulphate or permuriate of iron, imparts to it a high red colour, and after some time throws down a rose-coloured percipitáte. The infusion of the last is not so clear, of a dirty brown colour, and when diluted does not become yellow. On the addition of an alkali, it becomes greenish, and a solution of sulphate of iron gives it a dark-green colour, and throws down a copious satin black precipitate.[†]

Animals are readily destroyed by this substance, and the symptoms are violént convulsions, resembling tetanus, and which occur in paroxysms. The animal expires in one of these. On dissection no inflammation is found [‡] Professor Emmert, of Tubingen, communicated the following case to Orfila: "A child died after having taken, by mistake, a decoction of this bark; he preserved the use of his intellectual faculties, and earnestly begged that he might not be touched, for he experienced terrible cramps after each time that he was handled. He had a copious perspiration, but did not vomit."[§]

Laurus camphora. Camphor, when introduced into the stomach of dogs, produced general convulsions, loss of hearing, foaming at the mouth, and difficult breathing. Vomiting ensued, and they recovered. But when the œsophagus was tied, the consequence was death, and the stomach presented an inflammatory appearance, and in one case ulceration.

Although no case is recorded of death from camphor, in the human subject, yet the symptoms that large doses produce are, in general, similar to those above stated. Cold sweats, faintness, delirium, and feeble pulse are the usual attendants.[*]

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[*] Edinburgh Med. and Surg. Journal, vol. 13, p. 211.

[†] For a further list of its distinguishing characters, see Orfila, vol. 2, p. 280, and Edinburgh Med. and Surg. Journal, vol. 13, p. 210.

[‡] See a paper on this poison, by Emmert, in the London Med. Repository, vol. 6, p. 89.

[§] Pelletier and Caventou have lately discovered an alkali in this substance, on which its poisonous properties depend, and which they style *brucine*. When given internally, it produces tetanus and death It is not, however, the most rapidly poisonous of the vegetable alkalies, as it acts only with one-twelfth of the energy of *strychnine*. Four grains were necessary to kill a rabbit.—Annals, vol. 16, p. 30. Edinburgh Phil. Journal, vol. 3, p. 308.

Coculus Indicus. The fruit of the *Menispermum cocculus*, a native of Malabar and Ceylon.[†] It is used in India for the purpose of intoxicating, and thus killing fish, and this is done by throwing the berries on the surface of the water. Goupil, a physician of Nemours, ascertained that it destroyed fish not only, but also carnivorous quadrupeds, and Orfila has proved the same on dogs. It acts, he observes, on the brain, and produces convulsions.[‡] Goupil, however, deems it an acrid poison.

POISONOUS MUSHROOMS.

The number and variety of these are so great, that it will unnecessarily enlarge our pages to copy the botanical description of each. I will therefore only state a few characters which should lead us to doubt concerning their qualities, and, for further particulars, refer to systematic writers on this subject.

The following indications should excite a suspicion of mushrooms: A marshy situation in the shade—the substance soft, porous, and moist—an ugly appearance, and the surface more or less dirty—a glairy coat covering the surface—a virulent smell—a bright colour, or a combination of different colours. We should also regard as dangerous, all which have bulbous or soft stems, or have fragments of skin glued to their surface.[§]

The symptoms which generally arise from eating poisonous mushrooms, are thus given in a report to the Society of Medicine at Bourdeaux, and which is quoted by Orfila with high approbation. "Pains of the stomach, gripes, nausea, evacuations upwards and downwards, are the first symptoms with which the patients are attacked. Shortly after, heat of the bowels and faintings; the pains become more continued and violent; cramps, convulsions, sometimes general, sometimes partial, and unquenchable thirst succeed; the pulse is small, hard, tight, and very frequent. When the symptoms, after having lasted a certain time, do not diminish in consequence of the relief afforded, vertigo, a stupid delirium, and drowsiness affect some subjects, and are only interrupted by the pains and convulsions. In others there is no drowsiness; the pains and convulsions exhaust the strength; faintings and cold sweats come on, and death puts a period to this series of sufferings, after having been foreseen and announced by the patient himself, who has not lost his senses for a single moment."[||]

Poisonous mushrooms do not manifest their action generally until six or eight hours after they are eaten, and even twelve or sixteen sometimes elapse.

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[*] Orfila, vol. 2, p. 297 to 305.

[†] Boulley has detected an alkali in this, which is called *picrotoxine*, or *picrotoxa*. It is highly poisonous.—See Annals, vol. 2, p. 468, and vol. 13, p. 70. London Med. Rep. vol. 11, p. 517, and vol. 13, p. 75.

[‡] Orfila, vol. 2, p. 305 to 311.

[§] Ibid. vol. 2, p. 335.

[||] Orfila, vol. 2, p. 334.

The appearances on dissection are as follow: — "Violet-coloured spots over the integuments, very extensive and numerous; the abdomen extremely bulky; the conjunctiva as it were injected; the pupil contracted; the stomach and intestines inflamed, and scattered over with gangrenous spots—sphacelus is present in some portions of this viscus, and the stomach and intestines are contracted, so much so indeed, that in these latter the thickened membranes have obliterated the canal. The œsophagus in one subject was inflamed and gangrenous; and in another there was an intus-susceptio of the ileon from above downwards, for the space of three inches. One individual alone had the intestines distended with excrementitious matter. In none have any remains of the mushroom been found; they had been either completely digested, or evacuated. The lungs were inflamed and distended with black blood; the same congestion had taken place in almost all the veins of the abdominal viscera, in the liver, spleen, and mesentery. Inflammatory and gangrenous spots occur on the membranes of the brain, in its ventricles—on the pleura, lungs, diaphragm, mesentery, bladder, uterus; and even on the fœtus of a pregnant woman. The blood in this subject was extremely fluid; in other persons it was almost coagulated. Extreme flexibility of the limbs was not a constant appearance."*

ALCOHOL.

On the effects of this poison, when taken as it ordinarily is, by persons in habits of intoxication, it is not necessary for me to enlarge. I have only to refer to the effects of it in a pure state and in large doses, and then by comparing these results with the table published by Mr. Brande, of the quantity of alcohol contained in various kinds of liquors, an idea may be formed of the injury, and indeed danger, to which life is so freely and generally exposed.†

Mr. Brodie injected proof-spirits into the stomach of a rabbit. In five minutes, he lay motionless and insensible; the pupils of the eyes were dilated; there were slight convulsive motions of the extremities; the respiration was laborious, and he finally died at the end of an hour and fifteen minutes. In his further experiments, he found the stomach highly inflamed by the injection of this poison, but never observed any præternatural appearances in the brain. The symptoms, however, produced by spirits, are very analogous, he observes, to those caused by injuries of the brain.‡

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* Orfila, vol. 2, p. 334. Cases of poisoning by mushrooms may be found in this author, vol. 2, p. 313 to 335. Foderé, vol. 4, p. 62 to 70. Stalpart, vol. 1, p. 162. Trans. Coll. Phys. London, vol. 2, p. 216, case by Dr. Heberden. —London Med. and Phys. Journal, vol. 12. p. 385, case by Dr. Bardsley.

† See Mr. Brande's Tables in his Journal, vol. 5, p. 152. Rum contains 53.68 per cent. of alcohol; brandy 53.39; gin 51.60; cider only 9.87 per cent; ale 8.88; Madeira wine from 16 to 18; Port wine from 19 to 25 per cent.

‡ Eclectic Repertory, vol. 2, p. 269.

The degree of danger from intoxication, says an experienced observer, may be best estimated by the irritability of the iris. If the iris retain its contractile power, the patient will generally recover, however overpowered his senses may be; but if it remain in a state of extreme dilatation when a strong light is directed upon it, a feeble hope of recovery can only be entertained. This paralysis of the iris is generally accompanied with apoplectic stertor, laboured and imperfect respiration, and a slow oppressed pulse. Next to the insensibility of the iris, want of energy in the stomach indicates the greatest danger.*

Sulphuric æther, introduced into the stomach when the œsophagus was tied, produced vertigo, great weakness, difficult breathing, drowsiness, and death. The mucous membrane of the stomach was highly inflamed, as was also the duodenum; the blood in the heart was black, partly fluid and partly coagulated.†

Secale cornutum. (Ergot, spurred rye) This substance, either alone, or contaminating rye, has long been deemed a poison. It is stated to have given rise to epidemic diseases at various times, in France, Silesia, Prussia, Bohemia, Saxony, and Sweden. Perrault mentions, that in travelling through Sologne, in France, he was informed by some physicians and surgeons of that country, that the rye there was sometimes so corrupted, that those who ate bread made of it were seized with a gangrene, some in one part and some in another; some losing a finger, others a hand or the nose; and that this gangrene was not preceded by any fever, inflammation, or considerable pain, but that the parts fell off of themselves. The early symptoms were numbness, cold and livid skin, pain and swelling.‡

Tissot, in a paper in the Philosophical Transactions, presents a very copious account of the disease in question, and divides it into two forms—the spasmodic and gangrenous. He observes that the first accurate account of it was published in 1596. The spasmodic disease prevailed, according to Hoffman, in 1648, 1649, and 1675, in Voigtland; in 1702 in Friburg; in 1716 in Saxony and Lusatia; and in 1722 in Silesia. It was frequently attended with epilepsy. The gangrenous form was known in France as early as 1630, and in 1650, 1670, and 1674, it raged in Aquitaine and Sologne. It 1709 it appeared in Switzerland. The symptoms were similar to those already noticed. It attacked persons of both sexes and all ages, and in some instances, only the lower extremities became gangrenous; while in others, both upper and lower were affected.[*]

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* Bedingfield, in Edinburgh Med. and Surg. Journal, vol. 19, p. 493. See, on the symptoms from intoxication, a curious paper from the French, in New-England Journal, vol. 8, p. 389.

† Orfila, vol. 2, p. 342. Dr. Godman has lately announced a curious result from the inspiration of the vapour of sulphuric æther. It produces all the effects of nitrous oxide. Its exhilarating effects were striking, but in one individual, a female, predisposed to consumption, the muscular action induced left a cough, derangement of mind, and pain. She had several attacks of violent syncope, and remained ill for some time.—Godman's Western Reporter, vol. 2, p. 111.

‡ Phil. Trans. vol. 11, p. 758. See also vol. 59, p. 599, where cases are related that occurred at Orleans and Blois.

Mr. Srine has described its effects as occurring in 1736 in Bohemia. It commenced with an uneasy, stinging sensation about the feet. To this, severe cardialgia succeeded, and the hands and head were soon after affected; the fingers were strongly contracted, and there was a sensation of burning in the hands and feet. Giddiness, mania, or coma, succeeded, accompanied with opisthotonos, and a foaming at the mouth. These symptoms were followed by a canine appetite. All those who had epileptic symptoms died. The pulse was natural, and the spasms left a stiffness of the limbs. The disease continued two, four, eight, and sometimes even twelve weeks. Out of five hundred persons, three children died.[†] Gangrene of the extremities has also been observed in animals from the administration of ergot.[‡]

There is some diversity of opinion as to the real nature of this substance. Decandolle states that it is a parasitic plant; a mushroom, of the genus *sclerotium*. Others assert that it is a disease of the rye. The analysis of Vauquelin has not led to a decisive result.[§]

Lolium temulentum. (Darnel.) Naturalized in the United States. Bread made from the farina of the seed of this plant, and taken to the amount of six drachms, caused distraction of thought, indistinct vision, torpor, debility, and drowsiness, and these were followed by efforts to vomit. Tremors of the limbs, great depression, and difficulty of speech and vomiting succeeded.[¶] Similar effects were induced in a family from eating oat-bread mixed with darnel. The tongue exhibited a very strong trembling; and Seeger indeed remarks, that the trembling of the body is one of the most certain signs of poisoning by this plant.[**] Animals, and particularly dogs, are affected in the same manner as man. Chickens, however, eat the seeds with greediness, and without any bad consequences.[††]

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[*] Phil. Trans. vol. 55, p. 106.

[†] Orfila, vol. 2, p. 349. For some important remarks, referring the above diseases to deficiency of nourishment, rather than to diseased grain, see Rees' Cyclopedia, art. IGNIS SACER. I shall consider this subject more at length at another time.

[‡] It has been a subject of some interest and inquiry, whether the spotted fever which ravaged several districts in the United States some years since, had its origin in part or altogether from eating this substance, combined with grain. The facts adduced are very unsatisfactory, and lead to no definite conclusion. Some observations on this subject are contained in the New-England Journal, vol. 5, p. 153, p. 156, (an article by *Prof. Bigelow,*) and p. 235.

[§] See, on this subject, Brande's Journal, vol. 2, p. 278, 320; vol. 3, p. 157. Eclectic Repertory. vol. 7, p. 429. Silliman's Journal, vol. 2, p. 45. In this last, Dr. Tully maintains the opinion of Decandolle.

[¶] London Med. Repository, vol. 13, p. 260. This is the result of an experiment by Dr. Cordier on himself, with six drachms, taken early in the morning.

[**] Orfila, vol. 2, p. 352. Another case of the noxious effects of darnel, is related in the Edinburgh Med. and Surg. Journal, vol. 1, p. 106. It happened at Genoa during the scarcity occasioned by its blockade in 1800.

[††] Edinburgh Med. and Surg. Journal, vol. 1, p. 107.

Diseased wheat. When the farinaceous part of this plant becomes converted to a black powder, it imparts injurious qualities to the bread. Foderè states that he saw, in 1808, cholics and diarrhœas which arose from this cause.

Anagallis arvensis. (Meadow pimpernel.) Naturalized in the United States. Its extract produces, in animals, dejection, insensibility, and death. The mucous membrane of the stomach and rectum were found inflamed, and the lungs livid.

Aristolochia clematitis. (Common birthwort.) Vomiting, convulsive motions, weakness of the posterior extremities, dejection, and death, were induced by its root. The stomach and rectum somewhat inflamed.

Æthusa cynapium. (Common fool's parsley.) This plant has been the cause of injury, from its being mistaken for parsley. Orfila gives the following as distinctive characters:—1. The leaves of the fool's parsley are of a blackish green on the upper side, and shining. 2. They have no smell without being bruised, but they give out a nauseous smell when rubbed between the fingers. Parsley, on the contrary, presents an agreeable odour. 3. Its root is smaller than that of parsley, and dies every year in autumn.

Its effects are, heat in the throat, pain, cramps in the stomach swelling of the body and difficult respiration, drowsiness and starting. Delirium is occasionally present. The symptoms are more violent if vomiting does not occur.*

Riviere examined a body poisoned by it. The tongue was black; a brownish serosity was found in the stomach, and the liver was hard, and of a yellow colour.

Ruta graveolens. (Rue.) The distilled water and watery extract in large quantity, caused death in animals after a long interval, but its effects are not powerful.

Nerium oleander. (Common oleander. Rose-bay.) The extract of this plant produced in animals, vomiting, vertigo, weakness of the extremities, convulsions, and death. The distilled water and powder are less active. The digestive canal was not affected.

Morgagni relates the case of a female, who drank some of the juice of this plant. Vomiting soon succeeded. Her lips were brown; the pulse small and weak; the power of speech was lost, and she lay insensible. Death ensued nine hours after taking the juice. On dissection, the back of the body was universally of a violet colour, but the anterior natural. There was some heat of the body, though seventeen hours had elapsed since death; the blood-vessels of the stomach, intestines, and omentum, were much distended; the stomach contained a greenish fluid, but its membranes were sound; the right lung was red and adhering, while the left was completely collapsed. All the other viscera were natural.†

Mercurialis perennis. (Mountain mercury.) This plant is hurtful both to man and animals. It causes vomiting, diarrhœa, profound sleep, and convulsions. Ray relates the case of a man, his wife, and three children, who experienced deleterious effects from eating it, fried with bacon.[*]

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* Orfila, vol. 2, p. 250. Cases by *Mr. Stevenson*, in London Med. and Phys. Journal, vol. 15, p. 425. *Dr. Buchhave*, in Med. Commentaries, vol. 14, p. 37.

† Morgagni, vol. 3, p. 387.

Chærophyllum sylvestre. (Wild chervil.) The root of this plant has produced delirium, profound sleep, numbness and suffocation.

Sium latifolium. A native of the United States. This has also caused violent delirium on eating the root in August. Before that, it is not deemed noxious.

Coriaria myrtifolia. Sauvages states, that a labouring man and a child died in horrible convulsions, within half-an-hour after eating some of the berries of this plant.[†]

I shall add to these a bare catalogue of some foreign poisons, which are extremely interesting in a physiological point of view; but, from their rarity, little calculated to become the instruments of death in our own country.

Upas tieute and *Upas antiar.* The first of these was brought from Java, by *Leschenault,* and is said by him to be the extractive juice of a creeping plant, a species of *Strychnos.* The last is the juice of a large tree in Java, denominated by Leschenault, *Antiaris toxicaria.*[‡] The ancient opinion concerning the deadly influence of the bohon-upas, is now generally abandoned; but the products in question are, notwithstanding, virulent poisons. Numerous experiments have been performed with them on animals, by Brodie, Magendie, Delille, Orfila, and Horsfield. The tieute induces tetanus, asphyxia, and death, with great rapidity; and, on dissection, Dr. Horsfield found the brain highly inflamed. The antiar operates rather more slowly, and according to Mr. Brodie, death is caused by rendering the heart insensible to the stimulus of the blood, and stopping its circulation. But on these points I must refer to the authorities quoted below.[§]

Strychnos nux vomica. A native of Ceylon, the coast of Coromandel, and Malabar. The seeds are what is commonly called *nux vomica,* and this is the poisonous ingredient. Its action is rapid, and produces death suddenly in man and animals. A singular case is mentioned by Dr. Granville, of a patient at the hospital St. Louis, at Paris, whose right side was paralytic, and who took twenty-four pills of it. He would have suffered severely if proper remedies had not been instantly administered; but the convulsions which always accompany this poison continued, and afterwards affected only the diseased part, so that the arm, which before was lifeless, was now strangely and constantly agitated.* This poison has been made the subject of experiment by many physiologists.†

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[*] Lond. Med. and Phys. Jour. vol. 15, p 71. The case of a family poisoned by it, (of whom some died,) is mentioned in Phil. Trans. vol. 17, p. 875.

[†] Orfila, vol. 2, p. 354.

[‡] Upas is probably a common adjunct in the Javanese language to all poisonous plants.

[§] Quarterly Review, vol. 6, p. 514. Amer. edit. Annals of Philosophy, vol. 9, p. 202 and 265, containing Dr. Horsfield's essays on oopas, or the poison-tree of Java. extracted from the Batavian Transactions. Horsfield writes these poisons thus, *antshar and tshittik.* Orfila, vol. 2, p. 260, 287. Eclectic Repertory, vol. 2, p. 281. Brodie's experiments from Phil. Trans. Hosack's Med. and Phil. Register, vol. 1, p. 171, containing Delille's dissertation on the upas tieute. Annals of Philosophy, vol. 4, p. 259. See also Med. Comment. vol. 15, p. 36.

Strychnos ignatia, or *Ignatia amara*.‡ (Bean of St. Ignatius.) Its operation is similar to the nux vomica, and, like it, does not produce inflammation of the texture to which it is applied.§

Ticunas, according to De la Condamine, is an extract obtained from various plants, by the Indians of South America. The experiments of Fontana with it, indicate that it produces death in animals, either externally applied or internally given. The ordinary symptoms are, convulsions, faintings, great debility, and loss of feeling.||

Woorara is a poison with which the Indians of Guiana arm the points of their arrows. It does not appear to differ essentially from the ticunas. Mr. Brodie has performed several experiments with it, and he imagines it to produce death by destroying the functions of the brain.¶

Hippomane mancinella. (Manchineel-tree.) Dr. Peysonnel relates that a soldier, who was a slave with the Turks, eat some of the apples of this tree, and was soon seized with a swelling and pain of the abdomen. His lips were ulcerated with the fruit, and a cold sweat came over him. Having taken some remedy, (the avellana purgatrix) vomiting and purging were induced to a violent degree. He, however, gradually recovered.**

The wood of this tree, when green, will excite inflammation on the skin when rubbed against it,†† and it affords a most beautiful article of furniture, being interspersed with green and yellow veins, like marble; but the dust is of so acrid and poisonous a nature, that the sawyers and

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* London Med. Repertory, vol. 7, p. 163. This poison seems to have been known in the time of Valentini. See his Pandects, vol. 1, p. 622. *De nuce vomica penes furem deprehensa.*

† See experiments of *Magendie* and *Delille* in Eclectic Repertory, vol. 3, p. 274; of *Somerville, Harlan, Coates, Lawrence*, and *Hubbard*, in Chapman's Journal, vol. 2, p. 192; vol. 3, p. 296; vol. 4, p. 242; and of *Segalas*, in New-York Med. and Phys. Journal, vol. 2, p. 139.

‡ Pelletier and Caventou discovered an alkali in the nux vomica, and also in the Bean of St. Ignatius, which is denominated *Strychnine*. It is a most rapid poison. Magendie killed a dog with one-eighth of a grain, and the editor of the Edinburgh Med. and Surg. Journal states, that he has himself seen one die in two minutes after the injection of one-sixth of a grain into the cavity of the pleura.—Edin. Med. and Surg. Journal, vol. 18, p. 159. See Annals, vol. 16, p. 28. Brande's Journal, vol. 7. p. 375.

§ The fruit of the plant *feuillea cordifolia*, has lately been announced by Drapiez, as an antidote against vegetable poisons. He poisoned dogs with the rhus toxicodendron, hemlock, and nux vomica, and recovered them with this fruit.—Annals, vol. 15, p. 389. This, however, is not original with M. Drapiez, as Moseley mentions the same plant as an antidote.—Mosely on Tropical Diseases, p. 37.

|| See the experiments of *Fontana* in Phil. Trans. vol. 70, p. 163; also *Dr. Brocklesby's* in ibid. vol. 44, p. 408; and *Herissant's*, ibid. vol. 47, p. 75.

¶ Eclectic Repertory, vol. 2, p. 289.

** Philosophical Transactions, vol. 50, p. 772.

†† Phil. Transactions, vol. 3, p. 824.

carpenters are forced to work with gauze masks, to protect them from its injurious effects.*

Curare. The war poison of the Indians on the banks of the Oronooko, in South America. Some interesting details concerning its preparation are contained in the note extracted from one of the latest volumes of Humboldt's Personal Narrative.†

To these I venture to add the following:

Calidium seguinum. I add this on the authority of some remarks extracted from Hooker's Exotic Flora. This plant is a native of the West Indies, and is there called *dumb cane,* from the fact that its virulent juice, when applied to the tongue, causes a swelling, which deprives the sufferer of the power of speech.‡

Ava, or *yava root,* of Otaheite. This is said to be the product of a species of pepper, *(Piper methysticum,)* and it is chewed to great excess in that island. Its effects, when long persisted in, are redness of the eyes, general emaciation, trembling and paralysis, formation of a scurf over the body, and fatuity.*

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* Edinburgh Review, vol. 17, p. 374, Amer. edit.

† Esmeralda is the most celebrated spot on the Oronooko for the fabrication of this poison. The Indians collect the liana (bejuco) for the preparation of this (the *curare*), and it bears the same name as in the forest of Javita. It is the *Bejuco de mavacure,* which is gathered in abundance on the east of the Mission, on the left bank of the Oronooko, and in other places. "The juice of the liana, when it has been recently gathered, is not regarded as poisonous; perhaps it acts in a sensible manner only when it is strongly concentrated. It is the bark and a part of the alburnum which contains this terrible poison. Branches of the *mavacure,* four or five lines in diameter, are scraped with a knife, and the bark that comes off is bruised, and reduced into very thin filaments, on the stone employed for grinding cassava. The venomous juice being yellow, the whole fibrous mass takes this colour. It is thrown into a funnel made of the leaf of a plantain-tree, nine inches high, with an opening four inches wide. A cold infusion is first prepared by pouring water on the fibrous matter, which is the ground bark of the mavacure—a yellowish water filters during several hours, drop by drop, through the leafy funnel. This filtered water is the venomous liquor; but it acquires strength only when it is concentrated by evaporation, like molasses in a large earthen pot. The Indians, from time to time, invited us to taste the liquid. Its taste, more or less bitter, decides when the concentration by fire has been carried sufficiently far. There is no danger in this, the *curare* being deleterious only when it comes into immediate contact with the blood. The vapours, therefore, that are disengaged from the pans, are not hurtful, notwithstanding what has been asserted on this point by the Missionaries of the Oronooko. Fontana, in his fine experiments with the poisons of the *ticunas* of the river of Amazon, long ago proved, that the vapours arising from this poison, when thrown on burning charcoal, may be inhaled without apprehension, and that it is false, as M. de la Condamine has announced, that Indian women, when condemned to death, have been killed by the vapours of the poison of the ticunas.

The juice is thickened with a glutinous substance, to cause it to stick to the darts, which it renders mortal; but taken internally, the Indians consider the *curare* to be an excellent stomachic. Scarcely a fowl is eaten (adds our author) on the banks of the Oronooko, which has not been killed by a poisoned arrow. The missionaries pretend, that the flesh of animals is never so good as when these means are employed. Father Zea, who accompanied us, though ill of a tertian fever, caused, every morning, the live fowl allotted for our repast to be brought to his hammock, together with an arrow. Notwithstanding his habitual state of weakness, he would not confide this operation, to which he attached great importance, to any other person. Large birds, when wounded in the thigh, perish in two or three minutes; but it is often ten or twelve before a pig or a pecari expires." M. Humboldt does not seem to be acquainted with any certain antidote, if such exists, to this fatal poison. Sugar, garlic, the muriate of soda, &c. are mentioned doubtingly.—Tilloch's Phil. Magazine, vol. 58, p. 233. See also Orfila, vol. 2, p. 479.

‡ Edinburgh Phil. Journal, vol. 7, p. 395.

Spigelia marilandica. (Pink root.) A native of the United States. This, in large doses, is a violent poison. Its decoction produced vertigo, dimness of sight, and pain, in two children who took it. One vomited, but was not relieved. Staggering, incoherent talking, and delirium took place, until they fell asleep. They awoke relieved. The pupils were dilated during the influence of the poison.† Dr. Chalmers attributes the loss of two children, who died in convulsions, to this article.‡

Kalmia latifolia. (Mountain laurel. Laurel, in Pennsylvania-bay, in Virginia.) A native of the United States. Barton says, that the Delawares (Indians) poison themselves with a decoction of this plant.§ It is poisonous to some animals, as cattle and sheep; and in the human system, a very small quantity of the decoction has produced vertigo.||

Sanguinaria canadensis. (Blood-root.) A native of the United States. This is considered by Dr. Bigelow as an acrid narcotic. A dose of from eight to twenty grains of the fresh powdered root, produces irritation of the fauces, heartburn, nausea, faintness, and, frequently, vertigo and diminished vision. Vomiting is occasionally produced.¶

On a review of the poisons included in this class, it will be seen that greater diversity exists, both as to symptoms and appearances on dissection, than in either of the former. And there appears to be a leading distinction, which, as it were, subdivides it into four classes. Thus, "some are rapidly absorbed, and carried into the circulation: those animals that experience their effects, are in possession of nearly all their intellectual faculties; but the contraction of the muscles is such, that the thorax becomes immovable, asphyxia takes place, and death is produced, without the least trace of redness being discovered in the digestive canal. The upas tieute, the bean of St. Ignatius, nux vomica, and the brucea antidysenterica, are of this description." Some, again, produce a strong excitement of the brain, to which somnolency and loss of the intellectual faculties succeed. Inflammation of the digestive canal is rarely discovered. And of this class are camphor, cocculus indicus, and the upas antiar. A third class produces excitement and lethargy, accompanied with a local irritation, more or less intense; and to this belong belladonna, tobacco, stramonium, and hemlock. The last division are those which instantly destroy life, by acting on the nervous extremities; as the oil of bitter-almonds and the oil of tobacco.

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* Turnbull's Voyage round the World, vol. 1, p. 160, Lond. edit. Quarterly Review, vol. 16, p. 79, Amer. edit.

† Barton's Med. and Phys. Journal, vol. 1, part 2, p. 74.

‡ Dr. W. P. Barton's Med. Botany, vol. 2, p. 80. Dr. Bigelow's Medical Botany, vol. 1, p. 146.

§ Barton's Med. and Phys. Journal, vol. 1, part 1, p. 147.

|| Bigelow's Med. Botany, vol. 1, p. 137, 139.

¶ Bigelow's Med. Botany, vol. 1, p. 79.

The third of these, remarks Orfila, is alone *strictly* entitled to the title of narcotico-acrid.*

Treatment. My remarks here must of course be very brief.

The datura, belladonna, tobacco, digitalis, aristolochia, and cicuta, must be encountered with an emetic, and the vomiting must be aided by proper drinks. If symptoms of cerebral congestion supervene, venesection is advisable, and afterwards diluted acidulated drinks, frequently repeated. Inflammation is to be met by its proper remedies.

The upas, nux vomica, brucea, ticunas, camphor, and cocculus, and the whole of that class, require emetics; and Magendie and Delille afterwards recommend tracheotomy. In cases of wounds from them, the cautery is proper.

Mushrooms are best combated by emetics, cathartics, and clysters. Orfila places great dependence on cathartics.

When the patient is in an alarming state of intoxication, emetics and irritating enemas are indicated, and venesection is sometimes required.† Acidulated drinks are subsequently useful.‡

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* Orfila, vol. 2, p. 358.

† See, on this subject, Edinburgh Med. and Surg. Journal, vol. 12, p. 492.

‡ The following table, we think, is interesting in the present stage of discovery.—EDITOR.

SYNOPTICAL TABLE

Of the Physical, Chemical, Medicinal, and Deleterious Properties of the immediate Vegetable Principles, and of the Alcoloids recently discovered. By M. JULIA FONTANELLE.

N. B.—The termination in *ine* is applied to alkaline substances, and that in *in* to those which are not alkaline.

NAME of the Substances, of their Discoverers, and their Natural Conditions.	PHYSICAL PROPERTIES.	CHEMICAL PROPERTIES.	MEDICINAL AND DELETERIOUS PROPERTIES.
1. ATROPINE. Discovered by *Brandes*, in the atropa belladonna.	Inodorous, insipid; crystallizes in prismatic needles; colourless; turns green the syrup of violets.	Is decomposed by the action of caloric: almost insoluble in water, alcohol, and ether; neutralizes much acid and produces salts, the watery solutions of which give out by evaporation vapours which dilate the pupil and act as narcotics.	Is the deleterious principle of the *Belladonna*.
2. BRUCINE. Disc. in 1819, by *MM. Pelletier* and *Caventou*, in the false angustura, in the state of a gallate.	In leaf-shaped masses, of a pearly white, having the appearance of the boric acid and sometimes in elongated prisms; inodorous, bitter, pungent, and acrid; turning the sy-	Fusible at 102° Centigrade, congealing as it cools: is decomposed by a higher temperature: inalterable by the air: soluble in 500 parts of boiling water, and in 850 of cold; remaining in the state of a hydrate and retaining one-fifth of water: soluble in alcohol, almost in all proportions, and but	This poison acts on the spinal chord, producing tetanic contractions of the muscles. May be given in paralysis from a dose of one-eighth of a grain to five grains in the day. Four grains is sufficient to kill a rabbit; the same dose, however, does not kill a dog.

NAME of the Substances, of their Discoverers, and their Natural Conditions.	PHYSICAL PROPERTIES.	CHEMICAL PROPERTIES.	MEDICINAL AND DELETERIOUS PROPERTIES.
	rup of violets to green.	little so in ether: forms salts, which are poisonous, bitter, chrystallizable, and which may be decomposed by morphine. Is turned to a crimson red by concentrated nitric acid. This colour is changed by caloric to yellow; in this state the hydro-chlorate of tin forms with it a beautiful violet precipitate, a character which is peculiar to brucine. It is composed of 75·04 of carbon, 11·21 of oxygen; 7·22 azote; 6·53 of hydrogen.	
3. CATHARTINE. Disc. in 1820, by *MM. Lassaigne* and *Feneulle*, in the pods and leaves of senna.	Solid; yellowish brown; odour peculiar; nauseous and bitter.	Attracts humidity from the air; is decomposed by caloric; very soluble in water, alcohol, and ether; is decomposed by the concentrated acids.	Is the cathartic principle of senna.
4. CINCHONINE. Discovered by *Duncan* in cinchona bark.	White; chrystallizes in needles; inodorous; bitter; turns the tincture of violets to green.	Part is composed and part volatilized by caloric: it burns without leaving a residuum. In contact with the air, it passes, in time, into a state of a carbonate: soluble in 25·00 parts of boiling water: soluble in alcohol; very little so in ether: is capable of saturating more acid than the *quinine* is, and forms, with acetic acid, an incrystallizable salt, yet the acetate of *quinine* crystallizes. It is composed of carbon, 76·97; oxygen, 7·97; azote, 9·02; hydrogen, 6·22.	Its medicinal properties are the same as those of quinine, with this difference, that it takes five times as many parts, by weight, of *cinchonine*, to produce the same effects as one of *quinine*. It is nearly out of use.
5. CYSTISIN. Disc. in 1820, by *MM Lassaigne* and *Chevallier* in the seeds of the *cystisus laburnum*.	Solid; yellowish green; disagreeable taste.	Decomposed by heat, as also by concentrated acids; very soluble in water, alcohol, and ether. It contains no azote.	In the dose of eight grains it occasions vertigo, cramp of the stomach, and vomiting, which sometimes continue for two hours.
6. DELPHINE. Dis. in 1819, by *MM. Lassaigne* and *Feneulle*, in the seeds of staves-acre (*delphinium staphysagria.*)	A whitish, crystalline, and moist powder; inodorous; acrid and very bitter; turns syrup of violets to green.	Fusible, and gives, on its cooling, a hard and brittle substance; at a higher temperature it is decomposed, and burns without residue. Nearly insoluble in water, but very soluble in alcohol and ether. It forms neutral salts, which are acrid, very bitter and soluble. Concentrated nitric acid gives a yellow tint to this alkali, that differs from the red colour which the action of this acid on *brucine* and *morphine* produces. Not analyzed.	Its effects are much more energetic than those produced by the stavesacre. Six grains kill a dog in the space of two or three hours. In the state of an acetate, it is still more poisonous.
7. DIGITALINE. Thoughts of its	Microscopic crystals, in	Decomposed by caloric; very deliquescent; very so-	Half a grain dissolved in two drachms of luke-

NAME of the Substances, of their Discoverers, and their Natural Conditions.	PHYSICAL PROPERTIES.	CHEMICAL PROPERTIES.	MEDICINAL AND DELETERIOUS PROPERTIES.
existence entertained by *MM. Lassaigne* & *Chevalier*; actually discovered by *M. LeRoyer*, in 1824, in the leaves of the *digitalis purpurea*.	straight prisms, with rhomboidal bases; inodorous; very bitter; turns syrup of violets green.	luble in water, alcohol, and ether. The action of acids on it has not yet been well investigated.	warm water, and injected into the veins of a cat, killed it in a quarter of an hour, without occasioning any appearance of pain. One grain and a half injected into the jugular vein of a dog produced the same effect. The blood of animals thus poisoned assumed a vinous tint, and a slight tendency to coagulate.
8. EMETINE. Disc. in 1817, by *MM. Pelletier* & *Magendie*, in the roots of the *violaemetica*, *callicocca ipecacuanha*, and *psycotria emetica*, and by *M. Boullay* in the violet.	When pure, it is in a white powder, inodorous, and slightly bitter: turns syrup of violets green.	Fusible at 50° Centigrade. Above that it is decomposed. It becomes opaque on exposure to the air: little soluble in water, but very soluble in alcohol and ether. It only produces with acids, crystallisable salts with excess of acid, which are decomposed by the alkalies and magnesia. Galls precipitate it in flocculi of a dirty white. It is composed of carbon, 64·57; oxygen, 22·95; azote, 4·00; hydrogen, 7·77.	It has the emetic principle of ipecacuanha. Its activity is such that one sixteenth of a grain produces vomiting. The dose is one grain for adults. In that of two it has killed a dog.
9. GENTIANIN. Found by *MM. Henry* and *Caventou*, in the root of gentian.	In small yellow needles, inodorous, and very bitter.	By the action of caloric, part of it sublimes in yellow needles, and the rest is decomposed: is not changed by the action of the air: soluble in water; communicates to it a strong bitterness: very soluble in alcohol and ether; soluble in acids. (The concentrated sulphuric acid carbonizes it.)	A very energetic tonic and febrifuge.
10. IODE. Disc. in 1813, by *Courtois*, in the motherwaters of soda, as it is obtained from the sea-weed.	In a kind of bluish laminæ: odour that of cloruret of sulphur. A simple body.	Fusible at 107° Centigrade. It boils at 175°, and escapes in violet-coloured vapours: is not changed by the air. Soluble in 7000 parts of water; soluble in ether, and more so in alcohol in proportion as the spirit is rectified. These solutions change the colour of the skin to yellow. With oxygen it forms the iodic acid, and with hydrogen the hydriodic acid.	Used in the treatment of goitre, scrofula, chlorosis, cancer of the womb; of white swellings, tumours, scrofulous phthisis, inveterate syphilitic indurations of the glands, &c. It is employed in substance, in an alcoholic tincture, in the state of a salt and as a pomade. In the dose of from one drachm to one and a half it proves fatal, and produces ulceration of the mucous coat of the stomach.
11. LUPULIN. By *M. Planche*, and nearly at the same time by *MM. Ives, Payen*, & *Chevalier*, in the yellow	Solid, of a yellowish white aromatic, and very bitter.	Decomposed by caloric: is not changed by air; soluble in water, alcohol, and ether.	Tonic and narcotic: not poisonous. Doses not yet determined.

NAME of the Substances, of their Discoverers, and their Natural Conditions.	PHYSICAL PROPERTIES.	CHEMICAL PROPERTIES.	MEDICINAL AND DELETERIOUS PROPERTIES.
matter of the flowers of hops.			
12. **MORPHINE.** Disc. in 1817, by *Serturner*, in opium, in the state of a meconiate.	White crystals in rectangular prisms: inodorous; insipid; solutions bitter; turns syrup of violets green.	Melts and is decomposed at a slightly-elevated temperature. Unchanged by the air: insoluble in cold water: soluble in 42 parts of cold alcohol, and in 8 of ether. Its salts are bitter. Nitric acid turns it red; hence it is an important test of the presence of this substance. Morphine is composed of carbon, 71·01; oxygen, 17·28; azote, 5·177; hydrogen, 6·533.	Narcotic without the inconveniences of opium. *M. Bally* thinks that it is as active as its acetate, to which the preference is given on account of its solubility: as this salt is difficult to crystallize and to preserve, the sulphate appears preferable. The dose of these two salts is from one-fourth or one-third of a grain a day, in pills or in a syrup, to four grains a day. It is a poison which has become celebrated in the annals of crime.
13. **NARCOTINE.** Discov. in 1802, constituting one fiftieth of opium, by *M. Derosne*, who named it *opiene*.	In delicate needles, or in rhomboidal prisms. Inodorous and insipid.	It melts like fat, and is decomposed: unchanged by the air: slightly soluble in water: soluble in 24 of boiling alcohol, or in 100 cold: soluble in cold ether: forms poisonous salts. Composed of carbon, 68·88; oxygen, 18·00; azote, 7·21; hydrogen, 5·91.	Seems to act as a narcotic. *M. Bally* has given it to the extent of 60 grains, without obtaining very remarkable effects from it. Its acetate in the dose of a grain has killed a dog.
14. **PICROTOXINE.** Disc. by *Boullay*, in the *coccus orientalis* (the fruit of the *menispermum cocculus.*)	In quadrilateral white prisms, inodorous, very bitter. Turns syrup of violets green.	Decomposed by caloric: unchanged by the air: soluble in 25 parts of boiling water and 50 of cold: soluble in 3 of alcohol; and very soluble in ether. Forms very bitter salts, which are but little soluble in water.	It is to this substance that the *coccus orientalis* owes its deleterious properties: three or four grains of it kills the largest dog in an hour. It is also a most active poison for fish.
15. **PIPERIN.** Dis. by *Œrsted*, in black pepper.	In colourless and transparent prisms; inodorous, and almost insipid.	It melts, and becomes decomposed: unchanged by the air: insoluble in cold water: very slightly soluble in boiling water: very soluble in alcohol and ether.	According to *Bertini*, *Meli*, *Micclini*, *Simonetti*, and *Staniscalchi*, it is a most energetic febrifuge, and in a much smaller dose than the sulphate of quinine. It may be carried as far as 24 grains in the 24 hours. Fifty or sixty grains are sufficient for the cure of an intermittent.
16. **QUININE.** Disc. 1820, by *MM. Pelletier* and *Caventou*, in the cinchona.	White and incrystallizable: inodorous: very bitter. Turns syrup of violets green.	It melts, becomes idio-electric, and assumes, by friction with woollen cloth, the resinous electricity: is unchangeable in the air: soluble in 700 parts of water: soluble in alcohol, and still more so in ether: forms very bitter salts, of a pearly hue: saturates less acid than the *cinchonine*, and gives a crystallizable acetate. Is composed of	Its virtues are the same as the cinchona bark, but much more energetic. The sulphate of quinine is preferred. Four grains of this salt is equal to two drachms of the bark. This alkali and its salts are five times more energetic than the cinchonine and its sulphate.

NAME of the Substances, of their Discoverers, and their Natural Conditions.	PHYSICAL PROPERTIES.	CHEMICAL PROPERTIES.	MEDICINAL AND DELETERIOUS PROPERTIES.
		carbon, 74·56; oxygen, 7·7; azote, 10·84; hydrogen, 6·90.	
17. **RHUBARBARIN.** Disc. by *Pfaff*, in the rhubarb cultivated in Europe.	Solid: dark brown: opaque: odour disagreeable: bitter and nauseous taste.	Decomposed by heat: deliquescent: very soluble in water, alcohol, and ether. Nitric acid converts it into oxalic acid.	It appears to be the medicinal principle of rhubarb.
18. **SCILLITIN.** Disc. by *Vogel*, in the bulbs of the *scilla maritima*.	White; brittle; transparent: inodorous: fracture resinous; and bitter taste.	Decomposed by heat: deliquescent: very soluble in water, alcohol, and ether. The action of acids on it not yet ascertained.	The medicinal principle of the squill: it excites vomiting, the secretion of urine, and diarrhœa.
19. **SOLANINE.** Disc. in 1821, by *Desfosse*, in the *solanum dulcamara* and in the *boletus esculentus*.	White; granular; or in quadrilateral microscopic prisms: inodorous, slightly bitter, and nauseous. Turns syrup of violets green.	Decomposed by heat: unchanged by the air: insoluble in cold water: soluble in 8000 parts of boiling water: little soluble in alcohol and ether: forms incrystallizable and bitter salts, which, on evaporation, give a gummy mass.	Excites vomiting and sleep. Its acetate has only been as yet tried. Its effects have been little attended to.
20. **STRYCHNINE.** Disc. in 1818, by *MM. Pelletier* and *Caventou*, in the *nux vomica* and the bean of St. Ignatius.	In a white opaque, & sometimes pearly powder: inodorous: intolerably bitter. Turns the syrup of violets green.	Neither fusible nor volatile: unchanged by the air: soluble in 6667 parts of water at 10° R., or 25·00 of boiling water. Its solutions have an orange colour: a solution of one-six hundred thousandth part of a grain imparts a bitter taste: very soluble in alcohol: insoluble in ether. Forms some crystallizable salts, more poisonous than the strychnine. Composed of carbon, 78·22; oxygen, 6·38; azote, 8·92; hydrogen, 6·54.	This is the most active poison of all the vegetable alcaloids. It is twelve times more active than *brucine*: one-eighth of a grain kills the strongest dog, and one-fourth of a grain produces on a healthy man very deleterious effects.
21. **VERATRINE.** Disc. in 1819, by *MM. Pelletier* and *Caventou*, in the cevadilla, white hellebore, and in the colchicum.	A white, inodorous powder: taste acrid and burning. Turns the syrup of violets green.	Fusible at 50° Cent; on cooling, it presents a translucid mass of an amber colour: unchanged in the air: soluble in 1000 parts of boiling water: very soluble in alcohol: insoluble in ether. Its salts are incrystallizable. Composed of carbon, 66·75; oxygen, 19·60; azote, 5·04; hydrogen, 8·54.	A dangerous sternutatory: in a very small dose it produces vomiting and copious alvine evacuations.

CHAPTER XIX.

ANIMAL POISONS.

Cantharides—symptoms—effects on animals—appearances on dissection—treatment. Lytta vittata. Poisonous serpents—the viper—rattlesnake—variety in the effects of its bite—mockasin snake—antidotes against the bite of serpents—treatment of persons bitten. Scorpion. Tarantula. Bee—humble bee—wasp—hornet. Poisonous fishes—catalogue of these—cause of fish poison—treatment. Muscles—oysters—crab—lobster—mackerel—dangerous effects of these at certain seasons of the year. Orinthorynchus paradoxus. Toad. Pheasant or partridge—its poisonous nature at some seasons—cause. Poisonous honey—cause—effects—treatment. Dangers of dissection—consequences occasionally produced by slight injuries during dissection—treatment.

ANIMAL poisons are, as I have already stated, arranged by Foderè and Orfila under the class of septic and putrefying poisons, with the exception of cantharides, which is, with great propriety, placed among the corrosive. I shall commence with it, and notice the rest in their order.

CANTHARIDES.

Cantharis vesicatoria. (Spanish fly.) Cantharides, according to Robiquet, consists of various substances—a green fluid oil—a black matter, soluble in water and insoluble in alcohol—a yellow matter, soluble in both—a fatty matter, insoluble in alcohol—phosphates of lime and magnesia—acetic and uric acids. None of these are vesicatory, but the epispastic principle is a white crystallizable substance, insoluble in water, (soluble, however, in it, when mixed with the yellow matter;) soluble in boiling alcohol, and in the oils.* Dr. Thomson styles this *cantharidin.* We are, however, to treat of it as it is ordinarily administered, viz. in the form of powder and of tincture, and the usual symptoms are the following: When taken internally, cantharides excite a disagreeable and nauseating smell, acrid taste, retchings, copious vomitings, which are often tinged with blood, alvine evacuations, also more or less bloody, burning heat in the stomach and other parts, accompanied with griping and excruciating pains; great heat in the bladder, difficulty in making water, and the urine often bloody, sometimes totally suppressed; obstinate, and sometimes painful and excessive priapism, satyriasis, the pulse frequent and hard, while in some cases the jaws are closed; and convulsions, general rigidity of the limbs, and delirium, precede the death of the patient.[*]

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* Orfila, vol. 2, p. 422. The experiments of Robiquet are quoted in detail in the Eclectic Repertory, vol. 2, p. 405.

It is not necessary to detail cases illustrative of this catalogue of symptoms, nor indeed are they of a nature that would afford any useful result. In many instances, they originated in a desire to stimulate the exhausted passions of the debauchee, or, with more malignant and villainous intentions, were administered for the accomplishment of seduction.

The external application of cantharides, sometimes gives rise to similar consequences, but in a more mitigated form.

As to its effects on animals, Orfila found, that when injected in the form of tincture into the jugular veins, it produced vertigo, stupor, and death. The blood in the left ventricle of the heart was fluid and reddish—that in the right was black, and contained coagula. On using alkohol alone, however, he observed precisely the same effects. He then tried oil digested upon cantharides. The animal was soon deprived of sensibility and muscular power, and tetanus, convulsions, difficult respiration, and death supervened. The lungs were found very bulky and distended with a great quantity of reddish serosity; in some parts, they were livid and compact. The mucous membrane of the bladder was slightly red, while that of the stomach and duodenum was natural. When cantharides in powder were introduced into the stomach, they produced vomiting, the discharge of much bloody mucus, pain, great dejection, extraordinary insensibility, and death. The mucous membrane of the stomach was of a fiery red, that of the duodenum less so, but also inflamed. The bladder was sometimes seen inflamed and thickened; and the œsophagus also was occasionally inflamed.[†]

As to the appearances on dissection in man, they are generally similar to those from other corrosive poisons—inflammation of the stomach and intestines. Fungous tubercles, erosions, and small ulcerations, have also been noticed in these parts. The bladder has been inflamed or ulcerated, and, in some cases, the external organs of generation have been gangrenous.

If, on dissection, or in the matter vomited, any portion of this poison remain, it may be detected by its shining points, which are of a beautiful green colour. This, however, can only be hoped for, when it has been taken in the form of powder. When the tincture has been administered, we cannot expect to identify the substance, and must rely solely on the symptoms and the dissection.

Treatment. Oil is recommended by Orfila, but later experiments have demonstrated its injurious effects. According to Dr. Pallas, it increases the danger. Cantharides macerated in cold oil and afterwards given to dogs, was found to destroy them in a few minutes.[*] And this is owing to the oil dissolving the active principle. Mucilaginous drinks are preferable to excite vomiting, and to remove the irritation from the bladder. The warm bath, friction, and diluents are proper, and the antiphlogistic treatment is necessary, when any appearances of inflammation present themselves.

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[*] Orfila, vol. 2, p. 430 to 439. Le Clerc, p. 74, 75. New-England Jour. vol. 11, p. 18. Dr. Francis, however, mentions a case where six ounces of the tincture were taken without injury. New-York Med. and Phys. Journal, vol. 2, p. 28.

[†] Orfila, vol. 2, p. 424 to 430.

The *Lytta Vittata*, (Meloe Americana, Potatoe-fly,) and some other species of our own country, appear to possess properties analogous to cantharides.[†]

POISONOUS SERPENTS.

On these, I intend to be very brief, and shall merely give a short notice of those that are found poisonous in other countries. Somewhat more of detail will be proper in reference to such as are peculiar to the United States.

The Viper. (*Coluber berus. Vipera berus,*) is the most common poisonous serpent of England, and the European continent. Its bite is not uniformly fatal to man or the larger animals, but the season of the year appears to increase its intensity, being most venomous in summer. The symptoms are acute pain in the part wounded, which extends over the limbs and even to the external organs—tumefaction and redness, which afterwards passes to a livid colour—syncope, frequent, small, concentrated and irregular pulse—difficulty of breathing, copious and cold sweats, disturbance of vision and of the intellectual faculties, bilious and convulsive vomitings, and followed generally by yellowness of the skin. Gangrene is apt to occur in the wound, when the disease is about to terminate in death.[‡]

The *poisonous snakes of India* have been noticed by Russell in a great work, and his experiments are still the most valuable we yet have on the subject.[§] Notices are interspersed in abundance in various literary and scientific works, concerning the venomous serpents of other countries.[||]

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[*] London Med. Repos. vol. 19, p. 259. Quarterly Journal Foreign Med. and Surg. vol. 5. p. 304.

[†] See the papers of Dr. Chapman and Dr. Woodhouse, in the New-York Medical Repository, vol. 2, p. 168, vol. 3, p. 213—of Dr. Schott, in Eclectic Repertory, vol. 2, p. 193—of Dr. J. F. Dana, in Silliman's Journal, vol. 2, p. 187. This contains an analysis of the potatoe-fly, showing that Cantharidin exists in it.

[‡] On the effects of the venom of the viper, see Morgagni, vol. 3, p. 410. Orfila, vol. 2, p. 380. Edinburgh Medical Essays, vol. 6, p. 420. Fontana, in Phil. Transactions, vol. 70, p. 163. Redi in do. vol. 1, p. 160: Atwell in do. vol. 39, p. 394. Also, London Med. Repos. vol. 14, p. 522—Configliacchi's Experiments. New-England Journal, vol. 6, p. 311—Mangili's Experiments.

[§] An analysis of many of these is contained in Orfila, vol. 2, p. 387 to 403. See also, the Eclectic Repertory, vol. 2, p. 318, and Dr. Rankin's Exp. in Edinburgh Med. and Surg. Journal, vol. 18, p. 231.

[||] An extraordinary case is related by Dr. Pascalis, in the New-York Med: Repository, vol. 19, p. 78; of an individual who was bitten by a snake at St. Domingo. He survived the effects many years, but the leg and thigh swelled to an enormous size, and this remained permanent until his death. The only relief he experienced, was to open one or other of the capillary vessels on the swelling, and discharge four or five ounces of blood from it.

In general, the animal is most poisonous, and its effects most rapidly destructive, in warm climates. Hence the serpents of India and South America are distinguished above all others, for their venomous nature.

Crotalus horridus. (The Rattle-snake.) This is probably the most venomous snake known in our country, but its effects vary greatly; and this is doubtless, as has been suggested by Sir Everard Home, owing to the greater or less intensity of the poison.

"When the poison is very active, the local irritation is so sudden and violent, and its effects on the general system are so great, that death soon takes place. On examination after death, the only alteration of structure met with, is in the parts close to the bite, where the cellular membrane is completely destroyed, and the neighbouring muscles are very considerably inflamed.

When the poison is less intense, the shock to the general system does not prove fatal. It brings on a slight degree of delirium, and the pain in the part bitten is very severe; in about half an hour, swelling takes place from the effusion of serum in the cellular membrane, which continues to increase with greater or less rapidity for about twelve hours, extending during that period into the neighbourhood of the bite; the blood ceases to flow in the smaller vessels of the swollen parts; the skin over them becomes quite cold; the action of the heart is so weak that the pulse is scarcely perceptible, and the stomach is so irritable, that nothing is retained on it. In about sixty hours, these symptoms go off; inflammation and suppuration take place in the injured parts; and when the abscess formed is very great, it proves fatal.[*] When the bite has been in the finger, that part has immediately mortified. When death has taken place under such circumstances, the absorbent vessels and their glands have undergone no effects similar to morbid poisons, nor has any part lost its natural appearance, except those immediately connected with the abscess.

In those patients who recover, the symptoms go off more readily and more completely than those produced by a morbid poison, which has been received into the system."[†]

A case is related by Sir Everard Home, which illustrates the above views. Thomas Soper, aged twenty-six, was accidentally bitten twice in the hand by a rattle-snake. The snake was kept for the purpose of exhibition, in London.

The first symptom observed was an incoherence in language and behaviour, resembling intoxication. In less than half an hour, the hand began to swell, next the fore-arm, and afterwards the pain extended to the axilla. In two hours after the bite, Mr. Brodie saw him. The skin was cold, the man's answers incoherent, his pulse one hundred in a minute, and he complained of sickness. Ammonia and ether were exhibited internally, and applied to the wound. He rejected the first draught, but retained the second. Fits of fainting supervened, with coldness of the skin. On the next day, blood was extravasated under the skin as low as the loins, and vesications had formed on the wounded arm. Depression and faintings continued. These symptoms were present for several days, with greater or less severity. The arm sloughed in various places, and abscesses formed, accompanied with purging. Finally, mortification and delirium occurred, and he died on the fourth of November, 1807—eighteen days after being bitten.

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[*] A case strongly illustrative of this class of symptoms, is related by Mr. Breitnal, of Philadelphia, the actual sufferer himself in the Phil. Trans. vol. 44, p. 147. He survived the bite and recovered, but an abscess formed several months afterwards in the injured part.

[†] Home, in Phil. Trans. for 1810. Eclectic Repertory, vol. 1, p. 390.

On dissection, the body externally was found natural, with the exception of the arm that had been bitten. The wounds made by the fangs were healed; the lungs were healthy; the cavities of the heart contained coagulated blood; the cardiac portion of the stomach was moderately distended with fluid; while the pyloric portion was much contracted, the internal membrane had its vessels very turgid with blood. The intestines and liver were healthy. The vessels of the brain were turgid, and water was effused in it.*

The effects of the bite of the rattle-snake on animals are so well known, and in general resemble so closely those produced on man, that it is not necessary to recapitulate them.†

The *Mockasin snake* is another venomous animal peculiar to our country, and the effects of its bite are similar to those of the rattle-snake.‡

As to antidotes, and the treatment proper for bitten persons, we may remark, that these are numerous and diversified. Humboldt and Bonpland mention a New-Grenada plant, the *Guaco* (mikiana guaco,) the juice of which seems to deter snakes from biting persons on whom it is applied, and even when they are bitten, the application of the leaves prevents the usual effects.§

Arsenite of potash, (Fowler's solution,) has been used with great success by Mr. Ireland, in the West Indies, to counteract the effects of the bites of snakes.‖ The Pill of Tanjore, also an arsenical preparation, was sometimes used by Dr. Russel with apparent success on animals; but several, however, to whom it was administered, died in the same way as if nothing had been taken.¶

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* Eclectic Repertory, vol. 1, p 312.

† See, on this point, Phil. Trans. vol. 35, p. 309, 377. Dr. B. S. Barton mentions two cases of rabbits bitten by rattle-snakes. One recovered gradually in three days, the other died in 74 minutes. On dissection, the great curvature of the stomach was seen inflamed. Around the bite, blood was effused, and the solids were in a gelatinous, bloody state.—(Barton's Med. and Phys. Jour. vol. 1, part 1, p. 167.)

‡ New-York Medical Repository, vol. 8, p. 441. *Quere*, is the copperhead-snake, (*scytale mockeson* of Say, and *scytale cupreus* of Rafinesque,) and the mockasin snake the same animal? Silliman's Journal, vol. 1, p. 84, 256, contains some papers on these, but it is not stated whether they are identical or distinct. Say, however, observes, that the *coluber heterodon* is also often called mockasin.

§ Orfila, vol. 2, p. 441.

‖ See his cases in the Medico-Chirurg. Transactions, vol. 2, p. 396.

¶ Orfila, vol. 2, p. 446. New-York Med. Rep. vol. 7, p. 12.

Ammonia, and *Eau de Luce*, have many testimonies in their favour while some, as Sir Everard Home and Orfila, doubt their specific virtues.* They are, however, useful in promoting perspiration. Besides these, many plants have acquired a temporary reputation in our own country, and in South America. Of the former, are the Aristolochia serpentaria, Prenanthes alba, and Polygala senega; and in South America, the Eupatorium ayaparia, the Algalia or Yerba del sapo, and the Raiz preta. †

Caustics are valuable, but often prove ineffectual, and the treatment at present most relied on, is the application of ligatures above the part bitten, but not too tight, nor too long continued. Then cauterize the wound, with a hot iron or lunar caustic, and afterwards apply compresses to the part. Perspiration and sleep should be encouraged by small doses of ammonia, Madeira wine, and ether, and the patient should be kept in bed, well covered. Gangrene is to be combated with antiseptics.‡

The *Scorpion* is most venomous in southern countries. Instances are recorded, of its sting producing grievous local inflammation, and occasionally fever, trembling and pain, on man, in France and Italy. Animals, as dogs and cats, generally survive, though some have died from its poison.§

The *Tarantula* produces similar effects, local rather than general, and the fabulous stories respecting it are now well understood and duly appreciated. It would seem, however, that there are species whose sting may prove fatal. Dr. Graperon states, that he saw two fatal cases in the Crimea—one proved so in forty-eight hours, another in six days. The first was that of a peasant, who was stung while sleeping in his hut. The sting was soon very painful, his neck swelled, and the respiration became difficult forty-four hours after the accident. On the right side of the neck there was a brownish violet mark, the neck, head, and shoulders were swelled, and the thorax, from the clavicle to the false ribs, was of a bluish colour. Scarifications, the actual cautery, oil externally and internally, and ammonia, were all tried in vain.*

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* Testimonies in favour of these may be found in the Med. Commentaries, vol. 14, p. 297. London Med. Repos. vol. 8, p. 73. New-York Med. Repository, vol. 9, p. 109. Edinburgh Med. and Surg. Journal, vol. 18, p. 231. London Med. and Phys. Journ. vol. 29, p. 120.

† Dr. Brickell states, that *prenanthes alba* is a famous Indian cure for the bite of serpents.—Barton's Med. and Phys. Journal, vol. 2, part 1, p. 101. Dr. Barton's paper in the American Philosophical Transactions, vol. 3, p. 100, contains a long list of supposed vegetable antidotes against the bite of the rattle-snake. On the eupatorium ayaparia, see New-York Med. Repository, vol. 7, p. 16, and London Med. and Phys. Journal, vol. 29, p. 304. On the algalia, New-England Journal, vol. 3, p. 322. On the raiz preta, Edinburgh Phil. Journ. vol. 1, p. 218.

Besides these, many other remedies have apparently proved successful. Oil has been thus given, (New-York Med. Repos. vol. 2, p. 242) A living fowl applied to the wound, (Silliman's Journal, vol. 1, p. 259.)

Most of these illustrate the remark of Sir Everard Home, that "the violent effects which the poison produces on the part bitten, and on the general system, and the shortness of their duration, has frequently induced the belief, that the recovery depended upon the medicines employed."

‡ Orfila, vol. 2, p. 450. A case of cure by ligature is mentioned in the Eclectic Repertory, vol. 4, p. 388. I may add in this place, that I have been favoured with a communication from Dr. Holbrook, of Venice, Cayuga county, in this state, in which he relates several cases of persons bitten by snakes, who were remarkably and speedily relieved by the free administration of Peruvian bark in milk.

§ Orfila, vol. 2, p. 411.

The bite of the *spider* is also said to have caused local inflammation, together with general irritation, but I have not been able to find any well-authenticated cases.

The sting of the *bee*, the *humble-bee*, the *wasp*, and the *hornet*, have each occasionally produced dangerous and alarming symptoms. Inflammation, more or less extensive, has followed, and if the part injured be a sensitive one, great misery is produced. Several cases of this nature are cited by Orfila; and, in a cotemporary journal, a remarkable instance is mentioned, where the sting of a bee excited vomiting, fainting, sweating, trembling, and great difficulty of breathing. The patient had been stung on the back of the left middle finger, but it caused little pain and no swelling.†

The sting of the scorpion, bee or wasp, requires, according to its violence, internal or external remedies. Generally, emollient anodyne applications to the injured part are sufficient to allay the irritation, after extracting the sting. The volatile alkali is also a valuable medicine to be administered in severe cases.

POISONOUS FISHES.‡

Numerous cases are on record, proving the poisonous nature of various species of fish, and particularly in the West Indies. Dr. Burrows has given us a catalogue of such, which it may be useful to quote. Balistes monoceros, *(old wife.)* Ostracion globellum, *(smooth bottle-fish.)* Tetrodon sceleratus, *(tunny.)* Tetrodon ocellatus, *(blower or blazer.)* Muræna major, *(conger-eel.)* Coryphœna splendens, *(dolphin.)* Sparus chrysops, *(porgee.)* Coracinus fuscus major, *(grey snapper.)* Coracinus minor, *(hyne.)* Perca major of Browne, *(Esox barracuda, barracuda)*. Perca venenata, *(rock-fish.)* Perca venenosa of Catesby, *(grooper.)* Scomber maximus, *(xiphias of Browne, king-fish.)* Scomber thynnus, (*bonetta.*) Another species of scomber, (*cavalloe, horse-eye.*) Scomber cæruleo argenteus nudus, of Browne, (*Spanish mackerel*) Mormyra of Browne (*blue parrot-fish.*) Clupea thryssa, (*yellow-billed sprat.*) Cancer astacus, (*sea-lobster.*) Cancer ruricolus, (*land-crab.*) Mytilus edulis, (*muscle.*)

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* Quarterly Journal Foreign Med. and Surg. vol. 1, p. 215.

† Orfila, vol. 2, p. 414, 415. Edin. Med. and Surg. Jour. vol. 8, p. 130.

‡ For the purpose of abbreviating my references, and at the same time giving a view of the authorities to which I have referred, I will cite the following papers on fish-poison. *Dr. Chisholm*, in Edinburgh Med. and Surg. Journal, vol. 4, p. 393. *Dr. Burrows*, in London Med. Repository, vol. 3, p. 445. *Dr. E. Thomas*, in Memoirs Med. Soc. of London, vol. 5, p. 94. *Dr. Meyer*, in Barton's Med. and Phys. Journal, vol. 1, part 2, p. 43. *Mr. Quarrier*, in London Med. and Phys. Journal, vol. 25, p. 398. *Mariner's* Tonga Islands, vol. 1, p. 309, London. edit. *Mr. Anderson*, in Phil. Transactions, vol. 66, p. 544. *Orfila*, vol. 2, p. 417. *Dr. Dickson*, in Annals of Philosophy, vol. 11, p. 462.

Of these, Dr. Chisholm's is by far the most learned and copious, and I recommend it to those who desire an acquaintance with the medical literature of this subject. Dr. Burrows' is equally valuable.

Of all these, the clupea (*yellow-billed sprat*) is the most active and dangerous; and the usual course of symptoms from it is the following: itching over the whole body—violent cholic pain—a contraction and pungent heat of the œsophagus—nausea—heat of the skin, and great acceleration of the pulse—giddiness—loss of sight—cold sweats—insensibility, and death. Sometimes the disease is uncommonly rapid—convulsions ensue immediately after swallowing the fish, and death is a speedy consequence. Indeed, whites and negroes have both been known to expire at St. Eustatius, and other of the Leeward islands, with the sprats in their mouths unswallowed.* This, however, is said to be the only fish which produces *immediate* death, even within the tropics.

The grey snapper produces cholera morbus and excruciating pain, with efflorescence, and is apt to leave a weakness of the lower extremities, dimness of sight, and dulness of hearing.

These are also the ordinary results, with, however, some variety, that are experienced from the use of the various kinds enumerated in the preceding catalogue. The contraction and heat of the œsophagus does not occur in some cases, but in its place there is an excessive heat of the mouth and tongue. A miliary eruption, or an efflorescence over the whole body, is also very common.†

The cause of this poison has been the subject of much ingenious research. Dr. Chisholm inclined to the idea, that it was owing to the fish feeding on copper banks. He would seem, however, to have abandoned this, as, on chemical examination, a portion of the argillaceous stone of Antigua was found not to contain any; but a precipitate was obtained, possessing the qualities of sulphate of barytes.‡

Dr. Burrows has investigated this question with great ability. He is of opinion that the poison does not exist in the skin, or in the stomach and intestinal canal, or in the liver and gall-bladder exclusively, although there is no doubt that persons have been poisoned from eating these various parts. *It pervades the whole substance of the fish,* and this is abundantly proved by the statements of Dr. Chisholm, and the numerous authorities adduced by him. As to its origin, he discusses the cupreous theory of Dr. Chisholm, and shows the great improbability of the metal being held in solution in the sea-water. The fact also that land-crabs occasionally produce similar symptoms, is further urged against this opinion. The idea that other substances taken as food by fish, may be the cause of their poisonous nature, is shown to be unfounded. He concludes with advancing and establishing the belief, that a morbid change takes place in the system of the fish. And this is particularly to be expected in those taken from the tropical seas, as they are immediately exposed to a high temperature, and putrefaction must commence with the extinction of life, and proceed with intense rapidity.*

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* Chisholm, p. 395.

† Thomas.

‡ London Med. Repository, vol. 5, p. 13.

Treatment. An emetic (of sulphate of zinc) or cathartic should be immediately administered, according to the time that has elapsed since the ingestion of the poisonous substance. If, however, the spontaneous vomiting or purging be very great, it may sometimes be necessary to check it by anodynes. These are also proper when spasms supervene. And for the sequelæ, Dr. Chisholm advises a solution of alkalies in water. Sugar, containing a few drops of sulphuric ether, has also been recommended.

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* Burrows. I add the following, as it contains the observations of an acute and learned observer; and at the same time is, I believe, the latest notice we have on the subject.

"Jan. 18, 1819. A paper was read by Dr. Ferguson, before the Royal Society of Edinburgh, "On the poisonous fishes of the Caribbee islands."

The author endeavoured to prove, that, in all the larger fishes of prey, the poisonous quality was a rare and accidental occurrence, and that it was found to be present only at certain seasons of the year in one or two of the smaller species of fish, more particularly in the yellow-billed sprat, (the Sardine doré of the French, and Clupea thryssa of naturalists.) From whence he inferred that the larger voracious fishes, such as the baracosta, (Perca major of naturalists,) &c. became poisonous only at the times they had recently been preying upon the smaller poisonous prey. The notion of their being made poisonous from being found in copper banks, or their eating the stinging blubbers, (the medusæ and holothuriæ,) was refuted. In regard to tests, it was shown that none could be depended upon; that nothing whatever could be discovered from inspection of the fish; that the boasted test of boiling a piece of silver with the suspected fish proved nothing, whatever might be its actual quality; that so far from there being any marks of disease in the viscera, or other parts of poisonous fishes, they were found to be in the best season, and of the highest quality, in all respects.

The poison of the yellow-billed sprat was supposed to be inherent in the animal at certain seasons of the year, and not occasioned by its being fed upon any undiscovered local marine poison, from the circumstance of the other smaller fishes that were found in the same place, never partaking of the same poisonous nature, and from the poison of the fish being more potent and deadly than any known or even supposable article of food could be likely to communicate.

With respect to remedies or antidotes, the efficacy of sugar was alone established as deserving of credit. Wines, spirits, and the condiments used at table, were believed to have obtained occasional credit, only from being used in such slight cases of the poison as would likely have passed away without any remedy. As a precaution in all cases of suspicious fish of the larger species, the cleaning them out as soon as caught was recommended as a useful and proper one, to prevent the carcase being farther tainted by the lodgment of any poisonous matter (such as that of the yellow-billed sprat) recently swallowed; though it was shown, at the same time, that the doing so, and even salting the fish afterwards, could not in any instance do away with the poisonous impregnation so communicated to these voracious creatures, whose powers of assimilation, from the shortness of the intestines and great size of the liver, must be supposed to be infinitely quicker than what takes place among terrestrial animals. It was useful also, in a more humble way, by furnishing the material of the only criterion hitherto discovered for detecting the poison, which was shown to be that of giving a portion of the liver or offal to some inferior animal, such as a cat, a duck, or a pig, and ascertaining its effects upon them, before making use of the fish."—Edinburgh Phil. Journal, vol. 1, p. 194.

Muscles sometimes produce symptoms very analogous to those just related, and death has occasionally been the consequence in weak females and in children. Violent oppression and agony, swelling of the face, a scarlet efflorescence over the body, insatiable thirst, tormina and vomiting are the usual effects; and, in fatal cases, coldness of the extremities, low and quick pulse, hiccup, delirium and occasional coma.[*]

In a case which Foderè examined after death, he found the stomach and intestines slightly inflamed.[†]

The *oyster*, *lobster*, *crab* and *mackerel* of our New-York market, have each occasionally produced poisonous effects, although I know of no case of death from them.[‡] Some years since a quantity of oysters arrived in the month of September at Dunkirk, from Normandy. They were extensively purchased and eaten, and cholic, diarrhœa, and cholera morbus immediately prevailed to a great extent. It was supposed that the oysters were the cause, and Dr. Zandyck was commissioned to enquire into the subject. He found that many of these animals contained water, which left a slimy deposit, and had a decidedly brackish taste; and he suggested that the mischief might be owing to the weakness and langour of the oyster, which had not sufficiently animalized the contained sea-water.[§]

The treatment in all these cases must be similar to that already advised as to poisonous fishes generally.

Ornithorynchus paradoxus. It has lately been discovered that the spur of this extraordinary animal is hollow, and connected with a cyst, through which a poisonous fluid is injected into the wound which the animal makes. It causes inflammation and swelling, but does not prove fatal. In one case the arm swelled, the jaw became clenched, and the individual exhibited all the symptoms of persons bitten by snakes. They yielded to the external application of oil, and the internal use of ammonia, but he did not recover the use of his arm for a month.[‖] The tube is very minute, and so small, indeed, that it will not admit a horse-hair.[¶]

As to the venomous nature of the *Toad*, various and contradictory opinions have existed. It is doubted at the present day, though formerly it was believed. King John of England is supposed to have been poisoned by a drink in which matter from a living toad had been infused. Pelletier has analyzed the venom of the common toad, and states it to consist of an acid—a very bitter and even caustic fat matter, and an animal matter having some analogy to gelatine.[*] No experiments, however, appear to have been made with it.

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[*] See two fatal cases from eating muscles, by Dr. Burrows, in London Med. Rep. vol. 3, p. 445. Instances are also related in Orfila, vol. 2, p. 419, and Foderè, vol. 4, p. 85.

[†] Vol. 4, p. 85.

[‡] A case of poisonous effects from a crab, supervening within fifteen minutes after eating it, is mentioned in the New-York Med. Rep. vol. 12, p. 189.

[§] London Med. Rep. vol. 13, p. 58. [‖] Annals of Philosophy, vol. 9, p. 225.

[¶] Edinburgh Phil. Journ. vol. 6, p. 396. See, also, Blainville on the Spur. Annals, vol. 10, p. 112.

The *Pheasant* of this state and Pennsylvania, (or *Partridge*, as it is sometimes styled,) is deemed poisonous during the winter and spring, and the cause assigned for it, is its feeding on the buds of the laurel, (Kalmia latifolia,) which is one of the few shrubs which preserves its verdure throughout the cold season. The facts that we have on this subject are not numerous, but the impression is notwithstanding a general and probably a safe one. Dr. Mease has published several cases which occurred in 1791 and 1792, in Philadelphia, where individuals dining on pheasants solely, were, in a few hours after, seized with giddiness, violent flushings of heat and cold, sickness at stomach, and repeated vomiting. These symptoms were soon succeeded by delirium, weak pulse, and extreme debility, while some cases were marked by the preservation of the senses, but a total inability to articulate. They were generally relieved by emetics, diluents, and mild stimulants. One case of death ensued, but there were so many causes combining, that it would be improper to ascribe it to the food alone.[†]

In a case that occurred to Dr. Drake, also in the winter, vertigo, deadly sickness at the stomach, with extreme languor and exhaustion, suddenly attacked the patient. The pupils were dilated, no pulse was present in the arms or temple, and excruciating pain in the stomach, with a disposition to vomit next supervened. An emetic somewhat relieved these, but tenesmus and griping remained for some time, and he very gradually recovered.[‡]

Poisonous Honey. It has long been known that honey is occasionally poisonous. Many of the ancient writers contain facts on this subject, and, in particular, a number of the Greek soldiers, during the retreat of the ten thousand, are said to have been violently affected by some they had eaten near Trebisond.[§] I will only notice at this time, the effects that have been produced in our own country, and their probable causes.

Dr. Barton, in the paper already noticed, states that a party of adventurers removed some hives of bees from Pennsylvania to New-Jersey, in the hope that the savannahs of the latter country might be favourable to the increase of these animals, and consequently to the making of honey. They accordingly placed them in the above situations, and where the kalmia was the principal flowering shrub. The bees increased prodigiously, and their enterprize appeared successful; but it was soon found that every one who ate of the honey, became intoxicated to a high degree. It was then made into metheglin, but with a similar effect on those who partook of it.

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[*] London Med. Rep. vol. 9, p. 168. A case somewhat similar to the one mentioned in the text, is contained in Valentini's Pandects, vol. 1, p. 554. *De diarrhœa lethali a talpa (mole) potu ordinario injecta.* The answer of the Medical Faculty of Giessen, discountenancing this idea, and attributing it to horror, is also given.

[†] Mease, in New-York Med. Repository, vol. 1, p. 153. Barton, in American Philosophical Transactions, vol. 5, p. 60. The opinion has been long entertained, that the food of animals may become poisonous from feeding on noxious substances. A number of authors are quoted to this effect in Schlegel, vol. 3, p. 184, and among other remarks, it is stated that birds feeding on darnel have proved noxious.

[‡] New-York Med. Repository, vol. 21, p. 460.

[§] On the knowledge of the ancients concerning poisonous honey, see Dr. B. S. Barton's paper, in the American Phil. Transactions, vol. 5, p. 65 to 68, and Foderè, vol. 4, p. 290.

The usual symptoms are a dimness of sight, or vertigo, succeeded by a delirium, which is sometimes mild and pleasant, and sometimes ferocious, ebriety, pain in the stomach and intestines, convulsions, profuse perspiration, foaming at the mouth, vomiting and purging, and, in a few instances, death. Sometimes vomiting is among the earliest symptoms, and in that case the patient is readily relieved, although a temporary weakness of the limbs is not an uncommon result.*

Dr. Hosack has recorded two cases, in which this substance produced violent vomiting, cold extremities, and a livid appearance of the countenance. The pulse was reduced to about twenty in a minute. The spontaneous vomiting, however, being followed by a dose of castor-oil, together with the application of fomentations, relieved the sufferers. In these instances, the honey was of a dark-reddish colour, and a thicker consistence than is usually sold in the market.†

From the facts mentioned above, Dr. Barton is of opinion, that the poisonous nature of the honey is owing to the bees feeding on venomous plants—as the various species of kalmia, the andromeda mariana, which is destructive to sheep; the rhododendron; the azalea nudiflora, and the datura. He recommends that every fœtid or poisonous vegetable should be removed from the habitations of these animals.

Besides the poisons now considered, there are others enumerated by systematic writers, which I defer noticing, until I commence the investigation of MEDICAL POLICE. Of this description are *poisonous animals, used as food,* as oxen, sheep, &c. in whom the fluids have been depraved by disease, and *rabies* (hydrophobia.) I shall conclude this chapter with a few remarks on the *dangers of dissection.*

The accidents to which anatomists are exposed in the prosecution of their studies, are divided by Baron Percy into two classes—those resulting from the putrid gases extricated from the dead animal matters, and acting on the system generally, and those from inoculation of a septic principle, in wounds. I propose noticing the second only.

Fortunately, it is not a frequent occurrence, but the instances that are recorded are marked by a train of symptoms peculiarly malignant, and often suddenly fatal. Dr. Chambon pricked his middle finger with the sphænoid bone of a skull, that had been long macerating. He was soon after seized with the most intolerable pain, and inflammatory swelling of the fingers and hands. At another time, from a similar cause, the mental faculties were disordered, the pulse was irregular, and extreme debility was present.

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* Barton ut antea, vol. 5, p. 52.

† Hosack's Med. and Phil. Reg. vol. 3, p. 390.

Corvisart, while examining a dead body, pricked his finger. The arm immediately swelled to an enormous size, and it was only by making repeated and deep incisions into the tumefied parts, that Desault preserved his life.* Le Clerc, professor of legal medicine in the school of medicine at Paris, opened the body of an individual who had died of putrid fever. In dissecting, he wounded his fingers. The virus immediately penetrated over the whole system, and he died on the third day after the accident had taken place. On examination, all the viscera were found in a putrid state.†

Cases have also lately occurred in England and in this country. Dr. Pett, of Clapton, assisted a medical friend in examining the body of a lady, who died of peritoneal inflammation after child-birth, Twelve hours after, he complained of pain in the middle finger of his right hand, where a slight superficial wound was discovered. This was touched with caustic, and afterwards with strong sulphuric acid, but he did not feel either of the applications. A second application of lunar caustic produced intense pain. This was followed by severe rigor, and the pain spread with increasing agony along the arm. He passed a sleepless night, and in the morning his finger was white, and without sensation, and his countenance alarmingly altered. The arm went on to swell, the superficial absorbents appeared inflamed, the pectoral and axillary region became much affected, the finger put on the appearance of gangrene, and there was high nervous excitement generally. The unfavourable symptoms rapidly increased, and notwithstanding every means that was used, he sunk in 105 hours after the injury. On examination, the chest and abdomen were found healthy, the heart rather large and flabby, and the liver considerably deranged by a chronic affection.‡

A valued friend and colleague of mine, during the present summer, nearly lost his life from a similar cause. He punctured his finger with a needle while examining the body of a child. In forty-eight hours afterwards, acute, lancinating pains were felt in the wound, and it assumed a deep purple colour. The arm itself, and the glands of the axilla, also became affected, and were exquisitely painful. A general disturbance of the nervous system soon succeeded, and he was only relieved by a strict adherence to the antiphlogistic treatment.

These cases are sufficient to show the danger that sometimes follows from a puncture during dissection. Whether this danger is aggravated by a peculiar condition of the system, is in some degree still undetermined; but it is not improbable that the effects may be exacerbated in cases where there is no previous predisposition to disease, either of a temporary or constitutional nature.*

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* Percy. New-England Journal, vol. 8, p. 193.

† New-York Med. Rep. vol. 11, p. 433.

‡ Quarterly Journal Foreign Med. and Surg. vol. 5, p. 313.

As to the treatment, but little can be said. Chaussier recommends that every student should keep constantly in his pocket a small phial of muriate of antimony, and whenever he wounds himself, immediately cauterize the puncture with it. Percy advises the application of strong nitric acid.

The disease of the system can only be combatted by the same remedies that are generally applicable in cases where the nervous system is severely affected.†

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* There is a very curious fact recorded by Professor Silliman, in his Journal, (vol. 2, p. 168,) on the authority of Dr. Samuel Brown. Dr. B. informed him that he had had patients under his care, who had been bitten in personal combats, and whose *wounds exhibited every symptom of poison,* pertinaciously resisting all the ordinary modes of cure. The saliva and tartar of the teeth are mentioned as probably the deleterious substances in these cases.

† New-England Journal, vol. 8, p. 195.

APPENDIX.

CHAP. VI. § ii. 3.

Menstrual Blood.

"THE menstruous secretion is a fluid of a red colour, possessing very little tenacity, which does not coagulate, poured out by the arteries of the uterus, once every lunar month in healthy women, if they are neither pregnant nor suckling;* it begins at puberty, and generally continues till between the age of forty and fifty in this country; so that calculating the age of puberty to be the fifteenth year, and the duration of life to be seventy years, it may be said that the menstruous secretion is performed during three-sevenths of it.

"It is of consequence for practical purposes to observe, that menstruation is a secretion, and not an effusion of pure blood either from arteries or veins. All blood from the sanguiferous vessels (with very few morbid exceptions) coagulates; whilst the fluid of the catamenia does not, whether it comes away in a stillatitious manner, or is retained in large quantity, as in the case of imperforate vagina.

"Whatever is capable of increasing the determination of blood to the vessels of the uterus, may increase the quantity of this secretion; and if this determination of blood is increased above a certain point, the orifices of the vessels give way, and blood is mixed with the secreted fluid: but if, in consequence of this determination of blood to the uterus, inflammation takes place, then coagulating lymph is thrown out, as from other inflamed mucous membranes, and the secretion is diminished till the lamina of coagulating lymph is separated.

"From the definition above given of the menstruous fluid, it will be seen that it does not possess the coagulating part of the blood, and instances have occurred where the red colour has been wanting; but from the quantity of which, a woman has been obliged once in a month to take the ordinary precautions of a menstruating woman."—*Clarke on Female Discharges.* Part i. p. 14.

"Dr. F. Lavagna, of Milan, the nephew of the celebrated discoverer of ammoniacal injections in amenorrhœa, has lately analysed the blood secreted during the menstrual discharge, and has ascertained that it differs from common blood only in containing little or no fibrine."—*Anderson's Quarterly Journal of the Medical Sciences.* No. iv. p. 624.

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* "Some women who give suck do menstruate, but it is not usual."

Chap. VI. § 2.

Hydatids and Dropsy of the Uterus.

"As watery depositions are found to take place into different internal cavities, constituting dropsies of such parts, as of the thorax, abdominal cavity, &c.; so it has been supposed that a similar circumstance may take place into the cavity of the uterus, which has been mentioned by many writers under the title of dropsy of this viscus. The uterus, however, possessing an opening at its lower part, communicating with an external outlet, it is difficult to understand how any accumulation of fluid can take place within it; for, although the sides of the cervex uteri may be agglutinated by its proper mucus, or by adhesion in consequence of inflammation, such an occurrence is not very likely to take place; and even if it did happen, a deposit of watery fluid into its cavity would be an extraordinary concurrent circumstance.

"It is more than probable that the cases described as dropsy of the uterus have belonged to the class of hydatids; or if there be any such disease, in fact, as dropsy of the uterus, the author has never met with a case of it."—*C. M. Clarke on Female Discharges.* Part ii. p. 126.

Chap. VII. Part i. § 2. ¶ 1.

Consciousness of Delivery.

"M. Chaussier, and others, having doubted the possibility of the rupture of the umbilical cord, by the mere weight of the child, M. P. Meirieu presents us with a case of a Madame P. thirty-five years of age, in good health, and pregnant with her third child, who was struck by the pole of a coach on the left-side of the abdomen, in the eighth month of her pregnancy. She, however, was not taken in labour until the conclusion of the ninth month, and was delivered of a female child. A few moments before this event, Madame P. was walking about her room, and was seized with a strong pain; she took firm hold of the bed-post, brought herself nearer to the ground, retained the infant by means of her clothes, and placed it on the floor. The whole was the affair of an instant. One of the assistants took the child, and found the umbilical cord broken. This was before the arrival of Dr. Meirieu, who, on examination, found not the slightest traces of contusion on the child; it had, however, a spina bifida, occupying the lower part of the loins and the upper part of the sacrum. The umbilical cord was separated about four inches from the ring, and the end drawn out to a point. —*Quart. Jour. For. Med.* Vol. v. p. 634.

Chap. VII. Part ii. § 2.

Membrana Pupillaris.

"Before the destruction of the membrana pupillaris, the little arterial circle does not exist; and the ramifications which arise from the concavity of the great circle, instead of terminating near the circumference of the pupil, in the reciprocal anastomoses by which that circle is formed in the adult, prolongate themselves between the two laminæ of the membrana pupillaris. They advance as far as the centre of the pupil, under the form of very tortuous arcades, varying in size and figure, and having their concavity turned towards the circumference of the pupil. These arcades are very numerous, they do not anastomose with those that are diametrically opposite, but only with those with which they are in lateral apposition. The consequence of this very curious disposition is, that between the convexity of all the vascular arcades, and towards the centre of the pupil, a rather irregular space is left, in which the membrane is destitute of vessels, and consequently is weaker than at any other part.

" How is this membrane destroyed? What is the cause of its disappearance? What becomes of it, and of the vessels with which it is so abundantly supplied? At the seventh month of utero-gestation, the membrana pupillaris splits irregularly in its middle, so that a free communication is established between the two chambers of the aqueous humour, which were before entirely separated. The rupture or division takes place precisely at that spot where the arterial arcades turn their convexities to each other, and thence extends between their principal intervals, so that the vessels are untouched. The membrane is not destroyed in the secondary spaces, formed by each individual arcade. The little flaps of the membrane are found adhering to the circumference of the pupil, and floating in the aqueous humour: and the vascular arcades are seen in these flaps. The vessels have not been torn, but have only retired from the centre ofthe pupil, diminishing, of course, in their length. The arcades become gradually less and less, and at last retire entirely to the border of the pupil, in order to form the little arterial circle of the iris, which did not exist before the rupture of the membrana pupillaris.

" In the fœtus of the ninth month, the little arterial circle of the iris, which is formed after the rupture of the membrana pupillaris, and at the cost of its vessels, is seen placed on the very edge of the pupil; and often even in the new-born child, some of its vessels still advance beyond the circumference of this opening. In the adult, on the contrary, it is entirely situated upon the anterior surface of the iris, at some distance from the edge of the pupil. It is easy to be convinced of the reality of this assertion, by injecting these vessels in fœtuses of young subjects, or upon adults. The vessels which cover the anterior surface of the iris appeared to M. Cloquet more tortuous after the rupture of the membrane, than before; and he observes, that their arcades are the nearer to the circumference of the pupil, the nearer the fœtus is to birth. It is the vessels of the membrana pupillaris which partly form, in the adult, the coloured arcades, which we observe towards the little circumference of the iris, and which have been described by Haller, Ruysch, Zinn, &c.

" The figures given by Walter and by Sœmmering, are certainly contradictory to the statement of M. Cloquet. Both the former anatomists have represented the arcades in question as anastomosing across the centre of the pupillary membrane. We have also seen, in the museum of Mr. Charles Bell, a preparation in which an artery passes across the pupil, from the one edge to the other, being the whole remains of the pupillary membrane.

"Dr. Beer is of opinion, that the common idea of a pupillary membrane is totally erroneous. He thinks that there is no animal motion in the fœtus till the sixth month; but that at that period the embryo receiving animal life, the iris, till then completely closed, opens itself, as the eye-lids had done some time before, and that then the pupil is formed. This opinion appears in harmony with those of M. Cloquet." —*Quart. Jour. Foreign Med.* Vol. i. p. 64.

"Dr. Jacob's observations have led him to reject the idea that this membrane disappears about the seventh month, or that it is destroyed by a rent, as supposed by Blumenbach. He has usually found it present in most new-born infants, and gives a fine drawing of an injected one of the ninth month. He says the vessels become first obliterated, and then the membrane is absorbed."—*Anderson's Quarterly Journal of the Medical Sciences.* Vol. i. p. 110.

CHAP. XIII. § 1.

Putrefactive Odour.

"The chloruret of lime appears to be highly approved of for destroying the odour of the putrefactive process."—*Dr. Beck's Letter.*

CHAP. XIII. § 2.

Sulphuretted Hydrogen.

"Dupuytren has given cases of the effects of sulphuretted hydrogen, which I had not seen. They were published some eight or nine years ago."—*Dr. Beck's Letter.*

CHAP. XIII. § 3.

Signs of Death from Suspension.

"The examination of a woman who hanged herself at the Salpêtrière, and whose body did not present the marks given by authors—led M. Esquirol to make the following observations, which are of considerable interest in Medical Jurisprudence. The body still preserved all the traits of life, not only for some minutes after death, but even for some hours afterwards. On the first inspection, the trace of two turns of the cord were seen on the neck, though these were neither deep, nor was the skin discoloured. Seven or eight hours after death, the discolouring and swelling of the face, the livid hue of the feet, and the stiffness of the limbs, began to be perceived. There was no ecchymosis around the neck; and the sugillation observed at the instant of death had disappeared at the time of opening the body, twenty-four hours after. Then the traits of the face were little altered; the skin, which had become smooth where the impression of the cord had been, was neither livid nor ecchymosed, but as if it were burnt. The meninges were very little injected; the brain not at all: the lungs and heart were void of blood; the right ovary alone was gorged with dark blood. Now from these appearances it would have been concluded by those who knew not the circumstances, and were guided by the diagnostics of the writers on Forensic Medicine, Alberti, Zacchias, Louis, and Petit, Foderè, Vigné, Belloc, &c., that suspension had taken place *after* death. The cause of these erroneous diagnostics is, first, that they have uniformly supposed that strangulation and hanging produce genuine apoplexy, and they have, therefore, given the marks of the latter to the former; and, secondly, that they have only examined the bodies of those who have been suspended for some time after death, and the cord, of course, continued around the throat. In which case, there will be swelling, and lividness of the face, sanguineous foam at the mouth, the limbs stiff, and their extremities livid; but these depend upon the continuance of the cord till the body be cold.

"M. Esquirol thinks that he is therefore justified in concluding—1st. That the diagnostic marks laid down by authors to distinguish suspension before and after death, are by no means precise enough to be trusted. 2d. That ecchymosis round the neck is not a constant mark, and must, as De Häen thought, be considered only as an equivocal sign of suspension before death. 3d. That when a practitioner is called to see a body which has been found suspended, he ought to reckon as nearly as possible from the hour of death, and the time the cord has remained round the throat, as these two circumstances must be the foundation of his judgment concerning the case."—*Quart. Jour. For. Med.* Vol. v. p. 472.

The following is an account of the same case from the Edinburgh Journal:—

"An insane patient at the hospital of Salpêtrière was seen hanging herself in one of the gardens. An attendant immediately ran up and cut the rope; but all attempts to restore animation proved unavailing. The features were composed and natural, and the skin not discoloured or ecchymosed. There was a double mark on the neck, for the rope had been twisted round it twice; the mark was a simple depression, *without any change of colour.* In three hours and a-half, no alteration had taken place. In seven hours and a-half the body was cold, and began to stiffen; the face was a little discoloured, the legs livid, and the rope-mark of a *light brownish tint.* In twenty four hours the features were somewhat bloated, violet-coloured, but not distorted; and the eyes were open and brilliant. The body was examined twenty-five hours after death. At that time the rope-mark was brown, as if the cuticle had been burnt; but there was no ecchymosis in the vicinity. The cellular tissue beneath was dry and compressed, so as to form a *brilliant white band a line and a half in breadth.* The scalp was injected with black blood. The lungs and heart were quite natural, and *not gorged.*

"The author justly remarks, that if reliance was to be put on the signs of suspension, as they are related in works on Medical Jurisprudence, the foregoing case (*especially if it had been examined within the* *first six hours)* must have been attributed to suspension *after death*. He is wrong, however, when he states, that all medico-legal authors are as one as to the signs in question; for his countryman Foderè has explicitly declared, that they are not invariably present. The author farther maintains, that the remarkable differences observed in the bodies of hanged persons arise according as the rope has been left round the neck till the body cooled, or removed (as in the case described above) immediately after death. We shall probably recur to this subject on an early occasion, when we hope to show that these differences depend on another cause; and, at all events, that the explanation he has given will not account for all the facts. We may just add at present, that we compared the foregoing description with the appearances in the body of a woman lately executed in this city, and found it to agree with them *exactly*, except that there was no *brilliant band* in the subcutaneous tissue under the rope-mark."—*Edin. Med. and Surg. Jour.* Vol. xix. p. 487.

"M. Guyon, Surgeon-major, at Martinique, the intrepid experimenter on yellow fever, opened the bodies of twenty-one criminals, fourteen of whom had been hung, and seven decapitated, with a view of ascertaining the truth regarding the disputed subject of emission. Being placed near them at the place of execution, he observed the penis of those condemned to be hung, become erect at the instant of strangulation, and immediately afterwards five of them made urine abundantly. An hour after execution, he found in nine of them the penis in a state of semi-erection, and its canal filled with a kind of matter, with which the shirt was too profusely impregnated to allow it to be supposed that it came from any other organ than the prostrate. It is proper to observe, that those persons were negroes, and habited in white dresses. On dissection, the blood-vessels of the head contained little more than usual; those of the lungs were gorged; the right auricle almost empty; the alimentary canal was distended with gas, especially the colon; the cervical vertebræ were uninjured."—*Anderson's Quart. Jour. of the Med. Sciences.* Vol. i. p. 151.

CHAP. XIV.

Death from External Injury.

"If effusion of blood be found between the dura mater and skull, and if a bruise on the scalp corresponds to the part,—we may conclude that it has been caused by the blow; but if blood is found between the dura mater and the brain, though we should discover the marks of blows, or even fracture of the skull, still the question may be—might not the patient have been attacked with apoplexy during a struggle? An interesting question of this kind occurred at the York Assizes, in the summer of 1820. I shall here introduce the history of a case which occurred about twelve years ago, and at the dissection of which I assisted. This case has always made a great impression on my mind, for, as I was then very young, I might have given an erroneous opinion upon it."

It is related in Dr. Cheyne's Treatise on Apoplexy.

"An industrious man returning home from his work, found his house empty of every thing,—the bed he was to lie upon, and the tools of his trade, sold for gin by his wife, whom he found in a gin-shop, where she had been drinking and dancing. He brought her home, and, in the passage of his house, struck her, and ordered her to go up-stairs. She refused to go; he carried her upon his shoulders, and the contention continuing up-stairs, he struck her again. There having been no one present, we have only the husband's account of her death. He said, that whilst sitting on her chair, she fell down, upon which he threw her on the bed, conceiving she was in a fit, such as he had seen her in formerly. Some of her neighbours coming in, found her dead. Mr. C. Bell was requested to examine the body of this woman. The man was afterwards tried at the Old Bailey, for murder, and Mr. Bell's deposition was nearly to this effect: 'In the abdomen and thorax nothing appeared remarkable, further than that the stomach contained a quantity of gin; and that there was a blush of redness on the lower orifice of the stomach and duodenum. On the head there were several bruises; but the bone was not at all hurt, and no extravasation appeared under the bone. On exposing the membranes of the brain, the vessels of the pia mater were empty of blood, as if from pressure. There was a serous effusion under the tunica arachnoides, and in the cavities of the brain, similar to what has been found in those who have died from intoxication. On the surface of the brain there were what appeared to be spots of extravasated blood; but upon tracing them towards the base, they proved to be streams of blood which had flowed from a vessel ruptured in the base of the brain. The base of the brain was covered with coagulated blood, in which, also, all the roots of the nerves were involved. On dissecting the cavities of the brain, the blood was found to have penetrated into the ventricle, by perforating its floor. Upon taking out the brain, and tracing the vessels in the base, the anterior artery of the cerebrum going off from the internal carotid of the left-side, was found torn half way across: from this source came the extravasated blood.'

"The cause of this woman's death was the bursting of the blood from the ruptured vessel, and the pressure on the brain, or, more correctly speaking, on the vessels of the brain. As to the cause of the rupture, Mr. Bell's opinion coincided with the best authorities in pathology, that there is a state of the vessels, in which an external injury or shock is more apt to produce rupture—and drunkenness may be supposed to be the artificial state of excitement, which most resembles this state of the vessels. Being asked whether the blows were the cause of the rupture? he said he conceived it very likely that a shock would rupture the vessel: and being then asked, whether he conceived that this woman was more likely to have a vessel ruptured, from having been intoxicated? he was of opinion that intoxication, and the struggle, were likely to produce such a degree of activity of the circulation in the head, that a less violent blow might produce rupture than what in other circumstances would have proved fatal.

"The man was acquitted.

"A case, in many respects similar to this, occurred in February, 1822, but the man was condemned upon clear evidence of his having intended to commit murder.

"In concluding this subject, I feel it my duty to state, that appearances similar to those which are generally considered sufficient proof of some injury having been inflicted, are so frequently found in the bodies of persons who have been supposed to die a natural death, that in a question of murder, I would state to a jury, that if the cause of the person's death did not appear from collateral evidence to be sufficiently distinct to them, that they ought to receive with much reserve the evidence or reasoning of a medical man, upon the appearances which he may have noticed in examining the body. But still we ought, as anatomists, to claim the power of being the proper judges, as to whether the appearances in question may not have been produced by a cause unconnected with the supposed injury inflicted.

"The confidence with which some medical men give their opinion in court, and the dogmatical stile of the greater number of writers on medical jurisprudence, must be quite revolting to the feelings of those whose opportunities have enabled them to see the difficulties in which all questions regarding the cause of morbid appearances are involved. For farther illustration of the importance of this subject, I shall refer my reader to what is said on the diseases of the stomach."—SHAW'S *Manual of Anatomy.*

CHAP. XVI.

Arsenic.

"A man ate a bit of bread, and a sausage and a half, poisoned with arsenic. In two or three hours he was seized with vomiting and diarrhœa. The usual symptoms succeeded, and he died forty-eight hours after the fatal repast. The whole body was rigid. The stomach was natural externally, internally of a deep-red colour, not removed by washing or scraping, and near the duodenum there were several roundish specks, varying in size from that of a sixpence to that of a crown-piece, of a brownish hue, but whether ecchymoses or eschars could not be determined. The villous coat was swelled there, but not feeble. The œsophagus was natural. The duodenum and the upper part of the jejunum had a deep-red colour, and all the other intestines were strongly injected. The left cavities of the heart were of a mottled-red colour; and in the ventricle, especially on its columnæ, there were many small crimson specks, which penetrated into the substance of the parietes. The right cavities had a deep-reddish black colour, and the columnæ of the ventricle showed specks like the left ventricle, but less numerous or distinct. The aorta and other vessels were natural. Arsenic was found by analysis in the remains of the suspected food, in the vomited matter, and adhering to the inside of the stomach, *though the man had vomited incessantly for more than forty hours.* The author adds, that he had previously found, in experiments with arsenic upon animals, that the contractility of the heart was destroyed, and its tissue often inflamed.—*Edin. Med. and Surg. Jour.* Vol. xix. p. 486.

"Professor Orfila, and three other medical gentlemen, were requested by the *Procureur du Roi* to examine the body of a person who had been dead about a month, and was buried in the cemetery of Père-La chaise. When the body was disinterred it emitted a very disgusting smell, which was removed, however, by ablution with the dissolved chloruret of lime.

"The skin was everywhere of a mottled green or brownish colour; the epidermis and nails could be peeled off with facility; the subcutaneous cellular tissue was blown up with gases, and at some points the skin had begun to break down into *putrilage*. Notwithstanding these signs of advanced putrefaction, the inspectors proceeded to explore every cavity in the usual manner. Few appearances of note were detected in the head, thorax, or pharynx. A few ounces of ano leaginous fluid (changed by putrefaction) were found in the sac of the peritoneum. At the splenic end of the stomach, before the vasa brevia, there was a yellow spot externally, corresponding to a similar spot on its inner surface. Various reddish stains were scattered over the villous coat, and at the pyloric end some ecchymosed spots were apparent; but no decided evidence existed of these appearances having been the result of inflammation. The stomach, duodenum, and jejunum, were lined internally with a yellowish mucus; the ileum was empty; no part of these intestines exhibited any trace of inflammation. 'Nothing particular had yet caught our attention,' continues the narrator, 'when at last we encountered a little whitish particle, which, when examined with a magnifying glass, seemed to possess all the physical properties of the oxide of arsenic. A few more grains of the same description were then detected in the parts which we had already examined. These grains exhaled an alliaceous vapour when projected on burning charcoal; and their solution in water gave a yellow precipitate when treated with hydro-sulphuric acid with the aid of heat. The large intestines were then opened, and there we procured a great abundance of the same white powder; which was submitted next day to all the necessary tests, and distinctly proved to be the white oxide of arsenic.' The relator adds, that the greatest quantity of powder was always found where the yellowish mucus most abounded.

"The circumstances under which the crime was effected being rather singular, we shall extract them as they are related in the London Courier for the 2d of last December.—Madame Boursier, the wife of the deceased, had, for some time, indulged in an illicit intercourse with a Greek of the name of Kostolo. On the 28th of June, the husband complained to the girl, who used to prepare his breakfast, that his rice had a very disagreeable taste; yet, only a few minutes before, the girl, according to her daily custom, had retained a portion of the same dish for herself and one of the children, and both had eat it without perceiving any bad taste, or experiencing any inconvenience. During the interval betwixt the preparation of it in the kitchen and the time when M. Boursier partook of it in the parlour, his wife had been repeatedly passing and repassing from one room to the other. Not long afterwards the deceased was attacked with vomiting, which recurred frequently and violently till his death, which happened forty-three hours after the meal supposed to have been poisoned. The medical gentlemen asked permission to examine the body, but this was refused; and it was hurriedly interred next morning. Notwithstanding these suspicious circumstances, and the positive discovery of poison in the body, the woman was declared not guilty; but the report does not inform us what presumptions were in her favour."—*Archives Generales de Médécine.* Vol. ii. p. 58.

Chap. XVII.

On Tartar Emetic. By Dr. Duffin.

" Intending to take an effervescing draught early in the morning, Oct. 26th, 1822, I swallowed, instead of tartaric acid, from 20 to 25 grains of tart. antim., mixed with a solution of supercarb. sodæ. This was owing to the phials being accidentally misplaced. The mistake was instantly perceived, and in about five minutes I felt an uncomfortable sensation of warmth in the epigastric region, soon followed by an acute pain in the forehead, such as is described in *clavus hystericus,* and slight vertigo. Dr. Duncan, junior, and Mr. Wishart, visited me in about a quarter of an hour after the occurrence of the accident; the pulse was agitated, or such as might occur in any person equally alarmed. I was ordered to drink profusely of luke-warm milk. The symptoms continued as above for nearly 15 minutes longer; a slight degree of moisture then appeared on the forehead and back of the neck.

" By this time a quantity of sulphuret of potash was procured; and a tolerably strong solution of this being made, I drank about 6 ounces of it warm, and vomiting was produced in a few seconds, full, but remarkably easy. The matter ejected was to appearance like milk mixed with Kermes mineral. The vomiting continued for the space of about 20 minutes or half an hour, returning after intervals of a few minutes.

" The pain in the head, vertigo, and flushing, rather increased in severity. When the stomach appeared to have become sufficiently tranquil, a dose of castor-oil was taken in peppermint-water; the vomiting however returned, and was accompanied by retching, and ejection of bilious matter.

" The burning sensation in the stomach and small intestines was now so far increased as to occasion considerable restlessness; pulse rather weaker than natural, but steadily 88; tongue loaded with a white fur, fauces dry, and a very unpleasant taste in the mouth; disposition to sleep.

" At 12 o'clock, *a. m.* had a purgative enema, which operated mildly. The vomiting now ceased. I fell asleep, and wakened in about an hour, with slight vertigo, and sense merely of warmth in the epigastrium. These symptoms became gradually less troublesome, and in the space of perhaps two hours entirely disappeared, leaving me apparently nothing the worse for the accident.

"The next day, towards evening, my mouth became tender, the gums bled, and exhibited, in a slight degree, the spongy appearance of scorbutus. This symptom increased for two days, but, upon using an astringent wash, it disappeared gradually."—*Edin. Med. and Sur. Journ.* Vol. xix. p. 354.

CHAP. XVIII.

Oil of Tansy.

"A Mrs. Mercer, of Troy, near this city *(Albany)* died on the 22d of May, 1824, in consequence of taking a tea-spoonful and a-half of oil of tansy, having mistaken it for the common essence. It threw her into convulsions, and she died in two hours."—DR. BECK's *Letters*

CHAP. XVIII.

Tartaric and Citric Acids.

"Drs. Christison and Coindet found that these acids, when given to cats in the dose of a drachm dissolved in 12 parts of water, produced no effect whatever."—*Edin. Med. and Surg. Journ.* Vol. xix. p. 185.

CHAP. XVIII.

Poisoning by Acetate of Morphine.

"Most of our readers must have perused the afflictive trial of Dr. Castaing in the public papers, and have probably made up their minds as to the justice or injustice of the sentence. In the interrogations put to this unfortunate or guilty physician, he admitted that he had made toxicology his study—that he was acquainted with certain vegetable poisons, which left no trace of their action—that he had purchased acetate of morphine to make experiments on animals—that one of the persons deceased had drunk some hot wine in an inn with him--that a servant who tasted the wine found it sour—that the deceased had vomited—that he (Castaing) had mixed the acetate with an emetic substance for the purpose of experiments.

"Whether the moral or circumstantial evidence was strong does not appear. The medico-legal evidence was decidedly in Castaing's favour; thus, Laennec deposed, that the deceased might have died of a phthisical complaint—though the symptoms might have been produced by poison—which he was inclined to believe the case. Dr. Michel believed that death was owing to phthisis and not to poison. Dr. Petit thought the symptoms could not have been entirely owing to disease, but *might be* the result of poison. Two apothecaries deposed, that they had sold the prisoner acetate of morphine—and one of them 12 grains of the sulphate of morphine, (by mistake printed sulphate of *soda.*) Orfila deposed, that it was impossible, from the *proces verbal* and the appearances, to conclude that the deceased had died by poison. The appearances on dissection might have been by morphine, but they might also have been the effect of disease. It was proved (or thought so by the jury) that Castaing had forged a will of the deceased. This was strong moral evidence, and we have no doubt that the great strength of the said moral evidence has never reached us; for we are bound to believe, that a jury, (in a case involving no political matters) even in France, would lean to the side of mercy, if they possibly could. He was convicted by a majority of only two—seven against five. It is curious that, in a country where so much importance is attached to legal medicine, no ear appears to have been given to the medical evidence, even of Orfila!—But, *all* circumstances considered, we fear Castaing was guilty."—*Medico-Chirurgical Review.* Vol. iv. p. 968.

The following are the results of the experiments made by MM. Lassaigne, Deguise, Dupuy, and Leuret, on the acetate of morphine.

"The violence of the symptoms varies according to the species, age, and constitution of the animals subjected to its action. Stupor, sometimes amounting to a state of stupidity, and affection of the power of motion, were observed in all the experiments. Shuddering was frequently the first evidence of the action of the poison; this was often succeeded by general convulsions and paralysis of the posterior extremities; in some instances these symptoms continued, in others there were remissions of variable duration. The paraplegia, however, was pretty constant, and was more marked in proportion as the poisoning was serious. The last observation was also applicable to the stupor and torpor which appeared at various periods, and sometimes ceased for a time, soon to return again; they were not always accompanied by blindness or deafness; in fact, as regards the function of hearing, the authors remark, that animals apparently stupified were often alarmed by the slightest noise.

"Dilatation of the pupil, considered by some authors as a certain sign of narcotism, was not uniform; on the contrary, in many cases, the pupil remained unaffected, though the other symptoms were most decided.

"In most cases, more or less foamy slaver escaped from the mouth; this appearance sometimes preceded every other symptom; it was often attended by motions of mastication; but when analysed, the fluid did not present any trace of the poison.

"The examination of the bodies, performed at different periods after the exhibition of the poison, did not discover any traces of inflammation of the alimentary canal: so that the vomiting and evacuation by stool, so often observed, could not be attributed to that cause: the authors having witnessed the spasmodic contractions of the muscles, of the pupil, &c., reasoning from analogy, conclude that the phenomena in question should be attributed to a corresponding affection of the contractile organs contained within the abdomen.

"During the first moments succeeding to the ingestion of the poison, the pulsations of the heart were tumultuous, and could not be counted; they soon became full and slow, and in severe cases presented more or less intermission; the body at the same time losing its heat. The authors also observed a difference between the force of the pulsations of the heart and those of the arteries, and ask whether this effect should be attributed to the inspissated state of the blood, or to the effects of the diminution of the nervous influence on the circulation in the capillary vessels. They lean to the first opinion, having observed the blood in one case to be preternaturally thick.

" When respiration was affected, it was slow and uninterrupted, or accompanied with complaints and cries; in two cases, cats made the peculiar purring noise, which is considered as a proof that they are pleased, and which the authors refer to a state of intoxication, like that experienced by opium-eaters.

" The examination of the bodies did not present any appearance which could be considered peculiar to poisoning by the acetate of morphine; the most common, a slight injection of the arachnoid, was not observed in all cases.

" On the other hand, however, by means of chemical analysis (conducted by M. Lassaigne), the presence of the poison could be detected in the stomach, which, together with the nature of the symptoms, would of course always be sufficient to prove the cause of death. The authors, however, add, that the only decided proof of the presence of the acetate of morphine consists in obtaining the crystals from the contents of the stomach, and that the orange-yellow colour produced by the addition of nitric acid (a test commonly applied to discover the acetate of morphine), cannot be depended upon, inasmuch as that acid produces the same appearances with two other vegetable alkalies, viz. strychnine and brucine. In a medico-legal point of view, however, we think that this is of less importance than the authors appear to suppose; for, in the first place, the nature of the symptoms would frequently enable us to assure ourselves which of these substances was present; or, secondly, if this were not the case, it would answer all necessary purposes to be able to assert the existence of one of three active poisons, although we might be unable to pronounce which.

" In order to discolourize the liquids suspected of containing the acetate of morphine, the authors recommend the fluid subacetate of lead, a few drops of which are to be poured into an aqueous solution of the alcoholic extract obtained from the suspected substances. The colouring and azotic principles are precipitated, and the supernatant fluid, which retains but a very slight colour, contains only some alkaline salts, not decomposable by the metallic solution; the acetate of morphine; and a little excess of the subacetate of lead made use of: the latter is to be separated by means of a few bubbles of sulphuretted hydrogen gas. If the transparent solution now remaining were to be evaporated by heat, it would inevitably become coloured again; the authors, therefore, recommend a very elegant process, which obviates this inconvenience, and which consists in placing the solution in the vacuum of an air-pump, close to a vessel containing concentrated sulphuric acid.

In this way the saline principles are obtained without any foreign colouring matter, and it becomes easy to determine the presence of the acetate of morphineby the action of nitric acid.

"The authors found, in some of the cases, that although poisoning took place from the acetate of morphine, yet it was not possible to detect its presence, after death, in the stomach, in the blood, or other fluids. Hence they are naturally led to enquire in what manner it disappears. According to them it may either pass into the intestines, or it may be absorbed; or, lastly, its nature may be changed. As to the first, they deny that it enters the intestines, when introduced into the stomach, and appeal to their experiments in proof of this assertion. As to its absorption, particular circumstances prevented them from making any direct experiments upon this point, but they seemed inclined to deny its occurrence. The vena porta is of course the channel through which it might be expected to enter the system, but in dogs and cats, (the animals on which they operated,) the quantity of blood contained in it would have been too small to have led to any sensible results. To have made experiments on larger animals would have required enormous doses of the medicine, the high price of which would then have been an object of importance. They think it probable that the most careful analyses of the blood of the vena porta would not afford any trace of the poison. The sentence in which they make this assertion evidently contains some error; for in one line the authors are made to say, that probably it (the analysis) would not afford any such result, and in the next that it positively has not.—M. Barthelemy, of the Veterinary School at Alfort, has however performed this experiment, and in a single case detected some atoms of morphine in the blood of a horse, into which thirty grains had been injected ten minutes previously.

"Only one manner of accounting for the disappearance of the acetate of morphine from the stomach remains, and that is the supposition that it is digested like other vegetable substances: there are many probabilities in favour of this opinion; the authors found that the acetate of morphine was less active when placed in contact with a mucous membrane than when administered in any other way; opium is well known to be much more energetic in its action, when injected into the rectum, than when taken into the stomach; and, finally, herbivorous animals are peculiarly insensible of its operation. As to the real mode of action, of the acetate of morphine, the authors hazard the idea that it is through the medium of the nerves of the part to which it is applied, although they confess that this suggestion must be allowed to be wholly hypothetical.

"The acetate of morphine introduced into the cellular substance produced more serious symptoms than when taken into the stomach, and this was still more the case when it was injected into the abdomen or thorax.

"Not having been able to detect the acetate of morphine in the blood, even when it had been injected into the veins, the authors were led to enquire whether any decomposition took place when these two substances were mixed out of the body. M. Lassaigne investigated this part of the question, and found that the acetate of morphine is actually decomposed by the soda contained in the blood; the acetic acid having a greater affinity for the mineral alkali combines with it, and quits the morphine, which divides into two parts, of which one is precipitated, whilst the other remains dissolved together with the soluble principles of the blood.

"Some experiments, in which the poison was directly applied to various parts of the nervous system, such as the crural nerve, the brain, the cerebellum, appear to strengthen the supposition, that this system is the medium through which it acts. The effects of the poison appear also to demonstrate a specific action on the brain; but the authors differ from M. Flourens, who supposes that this action consists in producing a state of congestion: on the contrary, they found that though the injection of the capillaries was sometimes observed, in others it was wanting, and cannot be considered as a phenomenon uniform in its occurrence."—*Anderson's Journ. of the Med. Sciences.*

⁂ *Besides these Notes, which have been added at the suggestion of Dr. Beck, the following may not be unworthy of attention.*

CHAP. I.

Feigned Diseases.

Mr. Hutchinson has related (in the *Med. and Phys. Journal*) a great many curious instances of feigned diseases among our seamen; during the late protracted war, his situation, as Surgeon of the Royal Naval Hospital at Deal, having afforded him ample opportunities of witnessing, and often of detecting, such impostures. We shall glance at some of these.

1. "*Ulcers.* These have been formed and kept up by first incising a piece of skin, and then applying a blister, quick-lime, mineral acids, &c. In a limb which Mr. H. amputated, he found a piece of copper-coin imbedded between the gastrocnemius and soleus muscles. The man confessed that he had thrust this substance into the ulcer about nine months previously! The usual security against such tricks, is a well-applied bandage, from the toes to the knee, sealed with wax; but this was found inefficient, as pins were thrust through it, and the ulcer irritated. A wooden box was then placed round the limb, which proved effectual in preventing such practices.

2. "*Diarrhœa.* Our author has known diarrhœa, and even dysentery, induced in hospitals, for the purpose of invaliding—sometimes destroying the life of the infatuated self-tormentor. The means most resorted to by our seamen, were mixtures of vinegar and burnt cork, by which some of the finest young men in the service destroyed themselves.

3. "*Fever.* This is a disease which Dr. H. has known to be feigned. He relates a case where a French prisoner swallowed tobacco, and covered his tongue with soap. The tobacco caused great rapidity of the pulse, but the matters ejected from the stomach smelled

so strongly of tobacco, that the imposition was soon detected, and confession followed.

4. "*Contractions of Hands, Elbows, Knees, &c.* These are very frequently feigned by sailors. They can only be detected by carefully attending to a variety of circumstances, and taking the impostors off their guard.

5. "*Ophthalmia* has been produced by putting irritating substances into the eyes, as alum, lime, tobacco, &c.

6. "*Incontinence of Urine.* The best mode of detecting this imposture, in our author's experience, was the exhibition of laudanum, unknown to the person, and, when fast asleep, to place a clean napkin under him. The napkin, of course, will remain dry during sleep, if the disease be feigned, but be soiled, if real.

7. "*Strictures.* This disease was often feigned by naval officers, when they wanted to leave their ships, from any cause of dislike to the captain or others. Mr. Hutchinson generally detected it by placing the person against a wall, so as not to admit of retreat. A bougie was then passed into the urethra, when, in many cases, much difficulty was experienced in getting it beyond the perineum. If suspicion of imposture be entertained, the mind of the patient is to be drawn off, if possible, and an opportunity taken of passing the bougie into the bladder.

"Are we not liable to some error here, when spasmodic stricture exists, which may allow the bougie to pass occasionally, though it may be a very troublesome complaint to the patient in general?

8. "*Hernia.* Mr. Hutchinson remarks that, although seamen are very liable to ruptures, from their great exertions, in furling sails, heaving up anchors, and working the great guns, yet the operation for strangulated hernia is very seldom necessary. This we know to be the case; but then, we think the same remark extends to private life. There is not, we think, one case in 5000 which requires the operation, throughout England. Seamen, too, have *immediate* medical assistance, when an accident happens, which, of course, diminishes the chance of serious results.

"Mr. H. concludes this paper with a curious instance of voluntary power over the cremaster muscles, possessed by a man who could draw the testes up into the groin, so as to produce the appearance of hernia there, and afterwards let them drop down to the bottom of the scrotum, when the examination was over. Mr. Hutchinson was, however, too lynx-eyed an observer to be deceived by this; for, although the tumours in the groin puzzled him at first sight, he soon proved an *alibi* of the testicles from their proper domicile in the scrotum, and caught them peeping through the pope's eye. The man, on being detected, acted like a philosopher, "and seeing no longer any chance of eluding the King's service, displayed before us several very remarkable feats of power he possessed over these organs."—*Med.-Chirurg. Rev.*

CHAP. VIII.

Infanticide.

Examination of Objections.—Under this head, Dr. J. B. Beck has related some experiments on the lungs of a still-born infant, which are criticised in a very vague sort of way in Dr. Copland's Repository—who alleges that the experiments are "not at all confirmative," that he can hardly receive Dr. Beck's details "without questioning their accuracy—for, indeed, their language savours not of precision." After quoting the experiments themselves, he concludes by saying, "we must have experiments more accurately detailed than the foregoing, ere we can receive such statements as to daily variations of this nature."

We must also, on the other hand, have objections more accurately stated before we can answer them; for such a vague charge of inaccuracy, without giving any reason for it, cannot be met.—EDITOR.

Dr. Smith's Questions on Infanticide.

Dr. Smith has resolved to occupy himself more fully than has yet been done by any individual, with the important and ill-understood subject of proving or disproving the vitality of new-born children; or, to speak technically, of *Infanticide.* There is no point in *Forensic Medicine* on which so much perplexity exists, and for the elucidation of which so little has in reality been done. He is persuaded that this is owing, in great measure, to want of due pains being fairly bestowed; for whether the existing state of knowledge be estimated positively or negatively, no one who has at all looked at the question can be unaware that there is much work to be gone through ere satisfactory conclusions can be formed.

"It is almost impossible for any individual—at least Dr. S. feels that it is beyond the compass of his own power—to do justice to the problem; as few who possess the means can be supposed to have the leisure requisite to collect, arrange, and apply the necessary data. But he relies on the zeal and liberality of the profession to aid him in so important an undertaking. He therefore solicits from those who may have opportunities of handling the bodies of new-born infants, a few items of information, which he hopes will not occasion much trouble, and the aggregate of which he trusts he may be enabled to apply with precision and advantage—so that the truth may be established either the one way or the other, and to its due amount, with regard to certain doctrines that have been bandied about for many years, without any fair or satisfactory estimate as to their practical import.

Simple answers to the following queries form the object of the present application—premising that the subjects chosen must be perfect, that is, of ordinary developement, free from redundant parts, mutilation, disease, or putrefaction; and such as are *unquestionably* of the class to which they may be assigned: if in any particular instance there should be points in morbid anatomy which, in certain cases, might greatly assist in coming to appropriate conclusions, they should be stated.

" The subjects being classed, first, as STILL-BORN, or such as have never respired; and, secondly, as VIVI-BORN, or those that have come into the world alive, but have died within twelve hours; the queries may be attended to in the following order :—

" CLASS I.—*Subjects Still-born.*

REQUIRED—

1. " The sex. 2. Period of gestation when born. 3. How long KNOWN, or *supposed* (as the case may be) to have been dead *in utero.* 4. The cause of death. 5. Nature of the labour. 6. Exterior aspect of the body. α As to colour. β—integrity. γ—developement. δ—formation. ε—marks of violence, ecchymoses, or any peculiarity. 7. Length from the vertex to the under part of the heel. 8. Point at which the middle length of the body falls—to be given as regards its distance from the umbilicus. 9. Weight of the whole body prior to any interference with its integrity—to be accurately given in ounces and fractions, stating the species of weight used. 10. Aspect of the lungs *in situ*, on opening the thorax, and form of the diaphragm. 11. Weight of the lungs separated from all attachments, avoiding the spilling of contents. 12. Weight of any fluid that may escape from the trachea on holding the lungs over a vessel in the scale in an inverted position—but not squeezing them—and the fluid to be described. 13. Result of placing the lungs in a washing-basin of water, first entire, then separately; *i. e.* the right and left lung each by itself, noting if there be any difference of buoyancy in either, and which; as also when cut in pieces, noting any morbid appearances in these organs. 14. Weight of the liver, &c. managed in the same way, with the exception of placing it in water. 15. State of the alimentary canal, in regard to contents. 16. State of the urinary bladder. 17. State of the gall-bladder. 18. State of the ductus arteriosus and venosus. 19. Colour and consistence of the blood, specifying the part or parts of the body in which the observation may have been made.

CLASS II.—*Subjects Vivi-born.*

REQUIRED—

1. " The sex. 2. Period of gestation when born. 3. First actions' α As to crying, or manifestation of the respiratory process.—β state of the umbilical cord. γ—evacuations *per anum ac urethram.* 4. Cause, manner, and time of death.

" Then assume the queries as in the other case.

" It is neither expected nor desired that any individual shall take the trouble to furnish *a list.* One case, properly investigated, and clearly stated by an intelligent hand, will be worth hundreds of such as seem to have been collected abroad, one hardly knows how. In order, however, to impart necessary satisfaction as to the authenticity of the materials, it will be essential that those who may be pleased to transmit the result of their inquiries should verify them with their signatures; and in all cases, where practicable, Dr. S. will scrupulously acknowledge his obligations.—*Med. Repository*, vol. xxii, p. 260.

Trial for Infanticide.

" At the Dorchester assizes a woman was tried for infanticide, of which Dr. Robinson, of Bridport, has given the following report;—

" On the 26th of May I was sent for to see Mary Baker, who complained of tooth-ache, and exhibited two decayed teeth. She stated also having had a pain in her back, and bleeding at the nose. On examining the blood, I concluded that it had not come from her nose, from the appearance of that sebaceous matter on its surface which is the usual concomitant of labour. I went again to the chamber, and examined her breasts. The areola was exceedingly dark. I said, 'You are pregnant,' which she denied; and on putting my hand on her abdomen, I felt a hard tumour, as if she were five months gone, or as if there were a full-grown placenta. On my accusing her of pregnancy again, she said she was no more with child than I was. I replied, 'So much the worse for you; I'll swear you were with child last night, and you have done something with it,' and demanded to search her box. She refused to give me up the key; but, on breaking it open, I found a cloak, and under it a flannel petticoat. Beneath this, wrapped in a bloody apron, was the child.

" On laying it carefully on the table, I observed three wounds on the neck and chest. Imagining there might be serious mischief, I called in another practitioner. None of the wounds (which appeared, however, to have been inflicted with a sharp instrument,) was of any consequence. On opening the thorax, the pericardium was nearly covered by the lungs, which were so inflated as to occupy their full portion of the cavity, as if in consequence of repeated inspirations. The usual crepitus was perceived on cutting off a portion of the edge of the left lung, from which air was pressed in minute bubbles: it floated in water—as did the whole lungs afterwards, with the heart attached.

" The appearance of the abdominal viscera was healthy—the transparent cornea was brilliant, and the membrana pupillaris completely absorbed. The child was a mature female, full-sized, and what would be called fine. The umbilicus had been torn asunder, about six inches from the body, and had not been secured by any ligature. From all the appearances, I inferred that it had been born alive.

" On separating the scalp from the cranium, I observed, in the substance of the former, a portion of coagulated blood, about the size of half-a-crown; a quantity of bloody serum under it; and an infiltration of blood in the pericranium, nearly covering the right parietal bone—from which I inferred that the child had been killed by a blow on that part. The substance of the brain was firm; its vessels were turgid, and its general appearance gave signs of concussion. There was no blood in either ventricle; but a bloody serum was found in the base of the cranium.

" I delivered the woman of the placenta, immediately after discovering the child. She had cut off the umbilical cord close to her person, so that its length was not more than fourteen inches, and there was no adaptation of the extremities.

"At the trial the judge did not allow me to go into detail; for, in his charge to the grand jury on the preceding day, he stated to them that the floating of the lungs in water was now completely exploded by every respectable practitioner, and almost directed them in the case of Baker to find no bill. I thought myself among the list of respectable practitioners, having been engaged in practice twenty-five years with success, and yet I felt conscious of the importance of the hydrostatic test as a powerful auxiliary in these cases. The verdict of 'not guilty' was returned in consequence of the following question, put to me by the learned judge: 'Is it not possible for a woman, in her first labour, who goes to the night-stool, in the great agony felt on the child's coming into the world, to strike the head of the child against some part of the night-stool?' To which I replied in the affirmative.

"In addition to the foregoing statement, we shall remark, that in the newspaper report of this trial, when the counsel for the prosecution arrived at that part of his opening speech which related to the pulmonary test, Mr. Baron Garrow, the judge, is represented as having interfered in the following manner:—'*Mr. Bellamy*, I am extremely unwilling to interrupt you, but I feel it necessary to remind you, that the experiment which you describe as a test has been long exploded. It has been demonstrated to be a vulgar error by one of the greatest ornaments of science, and one who ranked the very highest in his profession. I speak with some confidence of the opinions of this great authority, as I have myself had the honour of living amongst his pupils in the early part of my life.' *Mr. Bellamy* then said, 'That after the observation of his lordship, he should not place any reliance upon the argument which he was about to deduce from the fact he had mentioned.' *Mr. B. G.*—'Do not, on that account, refrain from making any observation you please. There may be a good deal of remark opened by the circumstance you have just alluded to. I suppose that some such experiment has been actually made; and I am at a loss to know how any medical man, thoroughly skilled in his profession, should have had recourse to such a process as a test to the extent you mention.'

"We have a great respect for Mr. Baron Garrow; and, as we said before, particularly admire the view he took of the morality of these cases in general, which are by no means of that hideous and universally criminal nature that a coarse and unfeeling mind would represent them. At the same time, we cannot concede to his lordship any acquiescence in the opinions he has chosen repeatedly to express upon this nice point of physiology. We owe something to Dr. W. Hunter certainly on this very score; but his doctrines on the *docimasia pulmonaris* are utterly unworthy of his great name, and his real friends would avoid, as much as possible, their promulgation. It is *since his time* that the merits of the question have been investigated and appreciated. The test is indispensable, and of the greatest importance; no practitioner, at all acquainted with his duty, dare omit it, in seeking for proofs as to the vitality of new-born infants; but there is a wide difference between not unduly appreciating a fact, and denying its existence altogether. If his lordship were at all conversant with the later and better authorities on this point, we think he would not produce Dr. W. Hunter's paper on the bench for the purpose under notice. We admire Dr. Hunter's moral view of the case—we admire that of his lordship—they are the same, and they are our own. But we protest against public imputations upon a practitioner's character, in a matter in which he acts according to the general opinion of all the authorities of his profession. On the *docimasia pulmonaris* we repeat, that Dr. W. Hunter is *not* an authority."—*Med. Repository,* vol. xxii, p. 346.

Case of Captain Donellan.

This important case, which has justly called forth so much discussion, has been brought upon the tapis afresh by Dr. Male, by some very judicious remarks upon the opinion of Dr. Beck, and in defence of his own. Dr. Male, in these remarks, says,

"I am not contending, nor have I ever done so, that Donellan was innocent of the charge preferred against him: I think it very *probable* that he was guilty, but I still maintain that there was no positive proof of his guilt, although the chain of concurrent circumstances was sufficiently remarkable to throw strong suspicion upon him: his own caution to avoid this suspicion was the only evidence of his delinquency. The import of my assertion tends more to invalidate the medical testimony than to impugn the verdict of the jury. The delinquent was confessedly convicted solely on circumstantial evidence, arising from his own conduct, and from Lady Boughton's opinion of the smell of the fluid taken by her son; but the medical testimony throwing no light whatever on the cause of his death, ought not to have had the least weight with an intelligent jury, who decided, or should have done so, solely on the facts contained in the published account of the trial: this, therefore, I shall examine, and not attend to reports of experiments subsequent to that period, which, of course, were not in evidence before the court.

"The comparatively infant state of chemical and physiological knowledge at the time this trial took place, now forty-three years ago, must be taken into consideration, and have its due weight in appreciating the medical evidence; but no circumstance can justify positive assertion which is not established on facts, if they can be elicited, or on that careful experiment which can leave but little room for doubt.

"The indictment, founded on the coroner's inquisition, charges the prisoner with infusing and mixing with water a certain quantity, viz. ʒ ij. of arsenic, and substituting it for a certain medicine made up and to be taken by Sir Theodosius Boughton; nor is any mention made, nor even suspicion entertained, that any other poison had been administered; yet, at the trial, five months afterwards, the very same men, who had in the mean time been making experiments with *laurel-water,* suggested by Lady Boughton's description of the smell of the draught she had given to her son, a poison at that time but very little known to medical men, and less likely to have been known to a young military officer;—at the trial, I repeat, these men shifted their ground, and charged the prisoner with having poisoned Sir Theodosius with laurel-water. Why did they at the inquest fix upon arsenic, if they found none on examining the body? Was there no other known poison beside that mineral? It is not pretended that they found any, or instituted any experiments to indicate its presence; and it is probable that, if they had not hit upon the notion of laurel-water, Donellan would have been hanged for poisoning the deceased with arsenic.

"Dr. Rattray and Mr. Wilmer proved that laurel-water will kill dogs, cats, and hares; but it was not proved that the prisoner, although he had a still, had ever distilled laurel-leaves, or had had the fluid in his hands which was given to the deceased, and supposed to be the cause of his death. Dr. Rattray never saw an apoplexy attended with a heaving at the stomach, or froth issuing from the mouth: I will undertake to say that there are few observant medical men in extensive practice who have not; 'it is the effect,' says Mr. Hunter, 'of the voluntary action being lost.' The same physician thought it extraordinary that his gums should bleed, and that he should have an odd taste in his mouth, when standing over a body so highly putrid that it was opened in the public church-yard, and be it remembered, in the presence of Lady Boughton, the mother and principal evidence; she was present at the examination of the body of her only son. Does the Doctor mean to say that the effluvia of laurel-water could cause this odd taste and bleeding of the gums? If not, I do not see the tendency of the evidence.

"The evidence of Dr. Ash is very defective. He says, 'as to the appearances of the body on dissection, they were certainly, as far as could be collected at that distant period from the time of the death (eleven days), and in such hot weather (being the 9th of September), similar to those appearances which are found in bodies of animals that are killed by vegetable substances, and not from mineral ones.' Now, to every respectable practitioner, if it is possible to ascertain merely from the state of the stomach, even a very few days after death, in hot weather, whether inflammation of any kind has taken place? The redness from incipient putrefaction or the settling of blood surely will not, in the present state of our knowledge at least, be mistaken for inflammation. Yet Dr. Ash was a learned and most respectable physician, and his very respectability was injurious to the prisoner, for his testimony would have great influence on the decision of a jury.

"I am convinced there is no well-educated physician of the present day, at all accustomed to dissection, who would not be ashamed of such an opinion.

"This is the kind of testimony to which I allude in my work on Juridical Medicine, and wish to guard the medical profession against delivering, and the legal profession against receiving; it is too common, and inconceivably injurious."

Dr. Smith, in his forthcoming work on Medical Evidence, has taken up these arguments of Dr. Male in the following manner, premising the quotation from Male's Juridical Medicine on which they are founded.

"In the case of Mr. Donellan, a medical witness swore that Sir T. B. was poisoned by *arsenic;* afterwards that he was destroyed by *laurel-water,* although IT WAS NOT PROVED THAT THE DECEASED

WAS POISONED, OR EVEN THAT ANY POISON HAD EXISTED. Mr. Hunter declared that all the symptoms might arise from apoplexy or epilepsy, and that the appearances, on dissection, explained nothing but putrefaction—yet this unfortunate man was executed." I forbear any analysis of this passage—and shall merely take the liberty to suppose, that the author must have employed his mind attentively in considering the nature of the PROOF, or the *economy of* EVIDENCE, before he opposed this opinion to the verdict of twelve men—in the ears of whom, when they went out to deliberate, the following words must have been yet ringing:—' You must take all the circumstances of the case together into your consideration, and remember that it is for you to form your opinions, and to decide upon the fate of the prisoner, in the doing of which I am sure you will act according to the best of your judgment and your conscience, to find out the truth of the case—AND AS YOU FIND THAT TRUTH, SO YOU WILL PRONOUNCE YOUR VERDICT.' Dr. Male has observed, that a medical witness swore Sir T. B. was poisoned by *arsenic.* The witness in question was Dr. Rattray, who, *in his cross-examinatian,* swore expressly thus; ' At that time (on the coroner's inquest) I did think he died of arsenic; *but I am now clear that* I WAS THEN MISTAKEN!' Again: ' Did you not, after you heard Lady Boughton describe the symptoms, and after you saw the body opened, give it as your opinion that he died of arsenic?' ' *I have had* such an opinion.' And again, *still on his cross-examination!!* ' You was mistaken at first relative to forming an opinion that the death was occasioned by arsenic?'—' Yes.'

* * * * * " To what has been quoted from the very judicious animadversions of Dr. Beck, I have very little to add concerning the precise statements of Mr. Hunter, agreeing as I do to the full extent of my cotemporary's views. Still I would take the liberty to draw attention very particularly to a circumstance that has not, as far as I know, been pointed out.

" Mr. Hunter states, that he had a copy of the examination, (that taken by the coroner of course, and to which reference enough was made in cross-examining some of the crown-witnesses by the very gentleman who conducted Mr. Hunter's examination in chief,) submitted to him in London: but the counsel for the prisoner immediately waives that matter, and hastens from a part of the affair rather awkward for his case. Whether, according to law of evidence, or practice of the court, it was irregular to found any cross questions upon the voluntary or inadvertent allusion of a witness, on a point which was not gone into, I cannot say—but Mr. H. let quite enough out to warrant surprise that he did not come down better prepared on the occasion; unless we are at liberty to refer to a general hint thrown out in the text, and ask if his conduct may be considered in the light of a particular illustration? At what time he had this examination submitted to him does not appear; but the history of the case tells us that the inquest was held on the 12th September and continued till the 14th November: as the trial did not take place till the 30th March in the year following, a period elapsed in which all the experiments that could have been devised in the prisoner's favour might have been made. During more than six months, that the prisoner was in jail under the accusation, we learn from Mr. Hunter himself that nothing of the kind had been done.

"It is impossible to imagine that the parties concerned in a case of such magnitude, and on behalf of a man of such consequence, could have remained either insensible as to what ought to be done, or idle in the accomplishment of it. It is impossible not to surmise that the case was stated to Mr. Hunter at an early period—and stated to him for some specific purpose, consonant with his known talents and pursuits. We are not at liberty, (setting aside the general impropriety of imputation,) for a reason that I shall presently assign, to suppose that Mr. Hunter *did* make experiments with a particular view to this case; and I am conscious that I place the matter in the light most favourable to his reputation, when I suppose that he went down to Warwick in a state of premeditated ignorance—if ignorance be a word at all allowable in reference to John Hunter. That he had a knowledge of the properties of laurel-water, he states himself. Knowing this, if we knew no more of him, is it possible again to conceive that he could have two opinions concerning the ostensible merits of the case, and was not alive to the risk of going over the ground, (for the sake of the culprit,) that had been already, and with such consequences, traversed by the professional agents of public justice? He did the wisest thing he could for the cause in whose aid he was enlisted, provided there was a wish in his breast on behalf of the accused; and we may suppose that to have been the case, without the slightest impeachment of his integrity. There might have been friendship—there might have been a persuasion of Donellan's innocence—men as shrewd have declared this to be their belief.

"I have not yet exhausted my observations on this most important topic; but as what remains is a close commentary on the evidence, as reported to have been given by Mr. Hunter, it will less distract the attention of the reader, if I place it in immediate contact with the questions and answers, as numbered in the subsequent portion of this Appendix.

"There remains, therefore, but little to be added here; though what I have to subjoin is worthy of serious attention.

"Since the event in question, there has been a tradition in the medical circles, that John Hunter afterwards publicly regretted his having gone to give evidence in so unprepared a state, as to the matter of experiments. Later investigations, and the subsequent accumulation of facts relating to this poison, will not permit the supposition, that whatever experiments he might have afterwards made could have favoured the interests of the prisoner. It is therefore impossible to place any regret that the illustrious individual in question could have expressed, to any score but that of his regard for truth, and his own reputation as a philosopher."

FINIS.

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